

# THE AMERICAN SURGEON

Subscription in the United States, \$8.00

Vol. XVII, No. 12

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December, 1951

## VOLVULUS OF THE SIGMOID COLON

With a Report of Four Cases\*

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**V**OLVULUS is defined as a twisting of the bowel resulting in an obstruction. A relaxed mesentery with a narrow base and redundant colon is usually present. The resulting obstruction may be partial, complete or strangulated, and the signs and symptoms depend upon which of these is present.

There is great variation in the incidence of volvulus of the sigmoid as related to the total number of cases of large bowel obstruction. The reported figures vary from less than 1 per cent, as given by several authors<sup>1,4,6</sup> in this country, to 30 to 50 per cent of all large bowel obstruction as reported by eastern European authors.<sup>7</sup> Volvulus of the sigmoid is rare in the young and is more common in the male.

Griffin, Bartron and Meyer<sup>3</sup> speak of acute and subacute forms, this classification being based on the duration and severity of the symptoms. It is of the acute form that we are primarily interested, for early diagnosis and treatment are essential if these patients are to survive. An over-all mortality from 30 per cent to 45 per cent is given in the literature.

Careful questioning will usually elicit a history of repeated attacks of constipation. Frequently a diet made up largely of vegetables will be found and often a history of repeated purgatives. A large number of patients will have had previous episodes which were relieved by enemas. Often they will have tried similar con-

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servative treatment over a period of several hours before seeing a physician.

The presenting complaints are usually those of constipation, abdominal distention, vomiting, and indefinite, severe, colic-like pain of the lower abdomen which is referred to the back. Flatus and feces may be expelled after onset of symptoms and tenesmus and bloody discharge may occur.

Physically the patient appears dehydrated and there is pronounced distention of the abdomen. Abdominal tenderness is often moderate and occurs over the site of rotation. If peristalsis is audible, the involved loop of bowel is usually viable, while if absent, a gangrenous loop is frequently found.<sup>3</sup>

A leukocytosis with a shift to the left is commonly present.

With the sudden twisting of the sigmoid a closed loop is formed. A rapid dilatation of this loop with both gas and fluid takes place and it seems to rise out of the pelvis to occupy the abdomen.

X-ray examination will usually reveal a dilated loop of bowel occupying the right side of the abdomen. Levitin and Weyrauch<sup>7</sup> speak of a "hairpin turn" which is often present at the summit of the loop. A barium enema may demonstrate an accentuated "ace-of-spades" deformity.<sup>3</sup> As a rule these patients are able to take a limited amount of enema fluid, averaging about 500 cc. rather than the normal 2 to 3 liters.<sup>8</sup> On rare occasions an enema may reduce the volvulus and bring relief.

The treatment of volvulus of the sigmoid is surgical. The patient should be prepared by intubation, suction and fluid. Heavy doses of dihydrostreptomycin should be started early and continued post-operatively as indicated.

The conservative surgical treatment of untwisting followed by fixation of the bowel has generally been found to be unsatisfactory.<sup>2,3,9</sup> Resection of the involved bowel with either primary anastomosis or a Mikulicz type of resection seems to be the preferred method of treatment at present.

The prognosis depends largely upon the degree of toxemia but should be guarded as the mortality for acute volvulus is great.

From Jan. 1, 1935, until July 1, 1949, 4 cases of volvulus of the sigmoid colon have been seen at the Hillman and Jefferson-Hillman Hospitals. This is an incidence of less than 1 per cent of all intestinal obstruction seen during this same period.

Three of these cases were on the charity service while the fourth was a private case. One of the charity patients died in the medical

ward, the diagnosis being made at autopsy. Two died shortly following surgery, while the private patient survived the immediate illness only to succumb 24 days later from a massive abdominal abscess.

#### CASE REPORTS

**CASE 1.** A 57 year old white male preacher was admitted to the hospital on July 17, 1936. A history of absence of stools and flatus, nausea but no vomiting, severe sharp abdominal pains, gradual distention, and no results from enema for four days was elicited. The physical examination revealed a dehydrated male in acute distress. The abdomen was markedly distended and diffusely tender. Peristalsis was heard. Rectal examination was negative. The x-ray was reported as a low intestinal obstruction.

At surgery a volvulus of the sigmoid at the rectosigmoid junction was found. The distended loop was 10 inches in diameter and lay on the right side of the abdomen. After untwisting, the bowel improved in appearance and was replaced in the abdomen. The patient remained toxic and died July 19, 1936.

**CASE 2.** A 68-year-old white male farmer was admitted on April 8, 1939, and died eight hours after admission. He had been ill for two weeks and had had gradual distention and occasional emesis during that period. On physical examination a severely ill patient with a greatly distended and silent abdomen was seen.

An x-ray was reported as tremendous dilatation of intestine. The patient was treated on the medical service with suction and fluids.

At autopsy a volvulus of the sigmoid colon was found. There was an area of gangrene 6 cm. in diameter while the remainder of the bowel was dark red.

**CASE 3.** A 53 year old colored male night watchman was admitted on Nov. 13, 1943. One week previous to admission the patient had had cramps of the lower abdomen which were relieved by an enema. However, symptoms reappeared in two days and became worse. He had had no bowel movement for three days. He had been nauseated but had had only occasional emesis. His abdomen was greatly distended and there was slight rigidity. There were no masses.

An x-ray of the abdomen was reported as distention of the colon and most of the small bowel. A preoperative diagnosis of intestinal obstruction was made. At surgery a volvulus of the sigmoid colon was found. The involved loop was black and it was necessary to do an exteriorization and resection. The patient became steadily worse and died the following day.

**CASE 4.** A white female, aged 30 years, was admitted with complaints of severe, constant, low backache of 30 hours' duration, nausea, severe vomiting, absence of bowel movement and flatus for 24 hours, and swelling of the abdomen for the past 12 hours. She had been in good health previous to the present illness. She had had a similar attack six months previously which was relieved by an enema; however, an enema had again been tried with no results. She had been constipated for several years.

She was markedly dehydrated and distended. Only one high-pitched peristaltic sound was heard in a five minute period. She was moderately tender

in the left lower quadrant. There was only a mild leukocytosis, but there was a marked shift to the left. An upright film of the abdomen was reported as dilated loops of colon.

A Cantor tube was passed and a large amount of air and 1500 cc. of fluid were removed. She was given fluids and followed closely for a few hours. She did not respond to therapy and a volvulus of the sigmoid was strongly suspected. She was carried to surgery and a left muscle-splitting incision was made.

On entering the abdomen a large amount of serosanguineous fluid was encountered. Immediately evident was a greatly dilated loop of bowel which proved to be a closed loop of descending colon and sigmoid. The bowel was exteriorized and the gangrenous bowel removed. The patient was placed on penicillin, sulfadiazine and streptomycin. She gradually improved until the ninth postoperative day when she again became distended. It was felt that she had abdominal abscess with paralytic ileus. She was placed on Wangenstein suction. She became progressively worse and on the eighteenth postoperative day, an x-ray revealed distended small bowel. The following day she again underwent surgery.

There was considerable free fluid in the abdominal cavity with numerous loops of distended small intestine. A large abscess was found in the right gutter and the terminal ileum formed a portion of its wall. The abscess was drained and the terminal ileum was resected. The patient never improved and she died on the following day. At autopsy a generalized peritonitis with multiple abscesses of the peritoneal cavity was found. There was no leak found at the anastomosis so it was felt that the diffuse infection followed the initial volvulus.

#### COMMENT

Even though volvulus of the sigmoid colon is relatively uncommon in this country, the high mortality which is demonstrated by this and other series should make us conscious of its dangers. Each of these patients delayed in seeing a physician for at least 30 hours following onset of symptoms, and 1 was not seen for a period of two weeks.

Two of the patients had had previous episodes of a similar nature which might account for their delay in seeing a physician.

All of these patients were severely ill on admission to the hospital. It is felt that early diagnosis and treatment are necessary in patients with volvulus if they are to recover.

#### SUMMARY

A brief review and discussion of volvulus of the sigmoid is given. Four cases are presented in which none of the patients was seen by a physician before 30 hours from onset. Each of these cases terminated in death.



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## ADDENDUM

Since this article was submitted three additional cases of volvulus of the sigmoid colon have been seen. These cases were seen early and there were no deaths.

## THE LOW BACK PROBLEM

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**J**UST as it was a hundred years ago, the low back pain is still the "problem child" of the general practitioner and specialist alike today. Doubtless most of you have often said, "What a day, every other patient had a chronic backache!" And it is no wonder; so much has been written that is confusing, the field is so tremendous and failures have been so frequent that one feels hopeless from the very beginning. The differential diagnosis and mode of treatment in the bone and joint field alone is no little problem. When one adds the fields of gynecology, genitourinary diseases, internal medicine, neurosurgery, proctology and psychiatry, the problem becomes overwhelming.

We will limit our discussion to one phase of chronic bone and joint low back pain. We do not include fractures, congenital anomalies, acute strains that soon become well with rest, and conservative treatment, spondylolisthesis, scoliosis, diseases of bone such as tumor, tuberculosis and malignancy or arthritis per se. The latter may enter or complicate the picture and the same can be said for the ruptured disk. We are assuming that backache due to causes in other fields has already been ruled out. We emphasize the fact that 70 per cent of patients with a chief complaint of chronic low back pain will fall into the bone and joint field, and most of these will fall into the confines of this paper. Therefore, the final reason for limiting and choosing the subject. With additions and subtractions it is the back in which posture and the intervertebral disk plays the major role.

In evolving from the quadruped to the biped mode of progression we have created a vulnerable area, through creating a lordotic curve in the small of the back (figs. 1 and 2). As in any curved structure, the weakest point is at the apex of the curve and here it is at the lumbosacral joint or its immediate vicinity. A deviation from this precarious normal often leads to chronic pain and to changes in the intervertebral disks.

Posture, then, with or without disk changes with increased lordosis, dropped pelvis, ovoid abdomen and compensatory dorsal kyphosis, is the most common cause of chronic lumbosacral strain. The onset of most postural abnormalities is in adolescence and is idio-

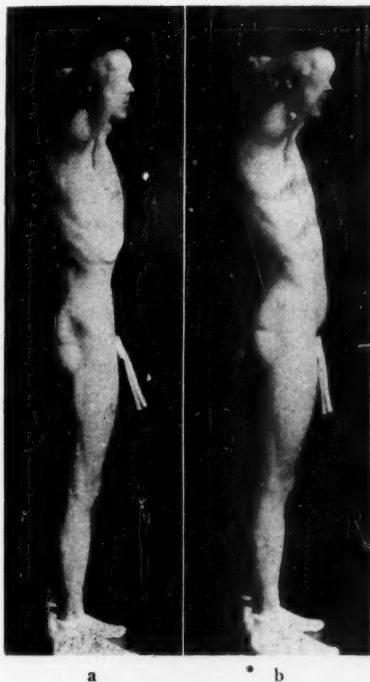


Fig. 1 (a). Increased lumbar lordosis.  
(b). Correction in the tall slender constitution.

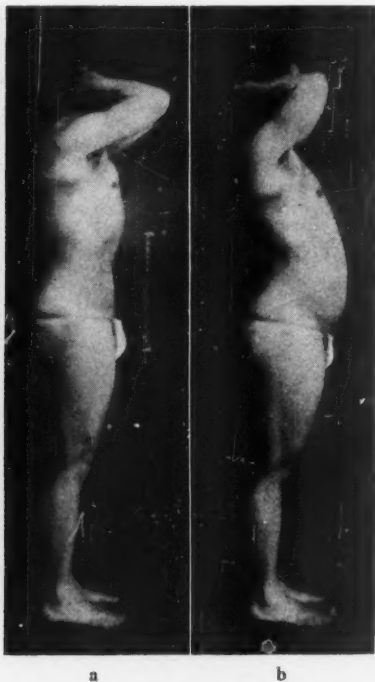


Fig. 2 (a). Increased lumbar lordosis.  
(b). Correction in the short heavy constitution.

pathic; during the years of youth and strength they are seldom symptomatic; as the thirties and middle age approach we need only the proverbial "straw" to become symptomatic. Structures atrophy, we become more tired, we slump, we have babies carried as a tumor anteriorly or we forget our age and try to move the piano.

These patients have intermittent, mild to moderate degree lumbosacral pain and tenderness without radiation—made worse with labor. Lying flat on their back on a fleshy buttock which increases the lordosis, they are made better by support and the flexed position of the lumbar spine. Straight leg raising is painful and limited, but "rocking" the low spine only reproduces a little soreness, and the patient states that it feels good. They obtain relief in this position. Flexion of the spine is rather benign, but extension is limited and painful. There is tenderness at the lumbosacral joint and the ileolumbar angle. The lordosis is obvious. Once started, the history reveals that there is slow progression and advancement of disability until treatment is necessary.

The x-rays, if properly taken, may show no abnormalities other than an increased lumbar curve. This is simple chronic lumbosacral strain on a postural basis. It is the most common cause of low back pain.

Since the etiology is mechanical, obviously there is no medical treatment other than an analgesic. Treatment is difficult and often unsuccessful because it is time consuming and requires an effort on the patient's part. As in any strain, the part should be put at rest until symptoms subside; if not too severe, we prefer the steel and leather brace. Casts, belts and corsets are permissible. Those with more severe symptoms will require bed rest in the jackknife position, compresses to the low back, but avoiding the position of hyperextension. Sedation is required, then the brace. As these patients feel better in two to six weeks there is a tendency to discontinue treatment and, of course, there is a recurrence of symptoms. The etiology must be corrected by exercises designed to lessen the lordosis and lift the pelvis in front (figs. 1 and 2). Not only must these be done so often and so well as to make the corrected position one easily assumed, they must be ingrained so deeply that a new habit is formed and adopted. Only then can the support be slowly eliminated. We find that all of this takes 6 to 12 months. Success depends upon our persistence and the patient's cooperation. There will be a limited number whose lordotic curve is so well fixed that correction is impossible and there will be those who can't or won't cooperate. These must be content to wear a brace either constantly or intermittently or consider the surgical approach.

In the analysis of the low back pain the roentgenological examination is of paramount importance. Simply ordering an anteroposterior and lateral x-ray of the lumbar spine is insufficient. Scout films centered over the midlumbar area will usually fail to show pathology in the lumbosacral area. Localized centering is necessary. In order to truly visualize the status of the intervertebral disk or space, the central ray must perpendicularly dissect the joint. This is of course seen best in the lateral view. If there is lateral malpositioning of the patient, true x-rays will not be obtained. Therefore, proper building up with pillows under shoulders, waist or leg is necessary. Except in lateral curvatures with rotation, and in vertebrae that are structurally changed, x-rays that fail to show the medial and lateral margins accurately superimposed cannot be accepted as true positioning.

X-rays also point out congenital anomalies. The significance is questionable but, to say the least, their presence predisposes to a weak or susceptible back. They also indicate the type of surgery possible if it is to be done. We feel that there are varying degrees



Fig. 3. Marked posterior collapse of lumbosacral disk; to a lesser degree at lumbar 4 and 5.

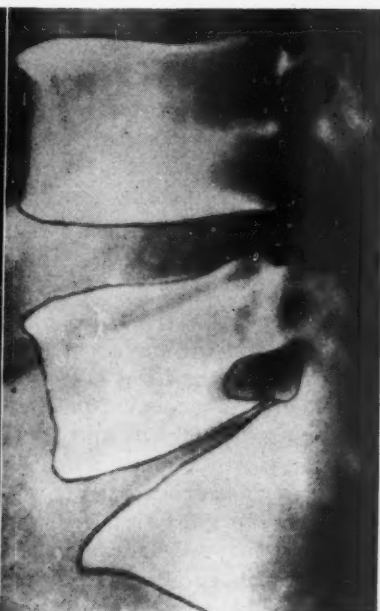


Fig. 4. Marked generalized loss of disk.

of instability of the low back. At surgery we find that a vertebra may be unusually and abnormally movable. These backs need surgical stabilization. This undoubtedly coincides with the back that, by x-ray, shows either increased lordosis or increased collapse of the disk on the standing lateral film, when compared with the one taken on the table.

We are unable to determine the status of the intervertebral disk clinically. Its deviation from the normal gives us an indication of the type of treatment necessary. We feel that collapse of the disk in our limited knowledge today, is traumatic in origin. By x-ray we find varying degrees of collapse. Some of these are a posterior collapse and some are generalized across the entire disk in the antero-posterior direction as seen in the lateral film (figs. 3 and 4). Where there is a marked increased lordosis we would expect to see most of the collapse on the posterior aspect.

Quite probably a disk can be collapsed immediately by trauma but we doubt if this is the usual etiology. At the time of the trauma there may be damage to the disk with subsequent degeneration and a gradual settling. More often the trauma is gradual and insidious,

due to postural lordosis, with gradual collapse of the disk. Unfortunately an accident may initiate symptoms and this brings into the picture the industrial back and the litigation patient.

In patients with disk changes our treatment consists of both a conservative regimen and surgery. In general we lean to the conservative approach. However, there are advantages and disadvantages to both. The decision is influenced by the age of the patient, his physical condition, length of time of disability, the degree of the collapse, his occupation, and of course the desire of the patient. Failure of conservative treatment would indicate surgery.

A posterior collapse of mild or moderate degree can often be lessened and the patient made comfortable with proper support, physiotherapy and correction of the lordosis. On the other hand, if the degree is maximum or if there is a generalized and complete settling with arthritis and sclerotic changes in the facets, internal fixation will give much better results. What one does with the nervous psychoneurotic patient is a moot question; we all know that they are not good risks from the statistical standpoint. However, in those that we believe have developed their nervousness from chronic pain, surgery is considered and sometimes done. In patients who are holding a second party responsible we lean far to the conservative side.

Methods of stabilization or fusion vary. In the past we included the first normal joint above the involved joint or joints. Today we are only fusing the joints that show pathology; we have found that proper fixing of the lumbosacral joint will correct a minor involvement of the disk at the fourth and fifth lumbar joint.

Also in the past we were content with simple fusion such as the Hibbs, the massive or osteoperiosteal graft. Today we have added the "bone block" principle in the form of an "H" graft as described by Drs. Breck, Moore and others. When this graft is tightly wedged into place, with the posterior processes of the vertebrae spread apart either with a lamina spreader or with the lumbar spine in extreme flexion, much can be done to correct the collapsed disk space and the lordosis (figs. 5 and 6). Using this bone block fusion principle enables us to make the patient ambulatory in a brace, eliminating the necessity of a body cast. The brace is worn except when in bed until fusion is complete. The average period of protection has been six to eight months.

While considering the collapsed disk, our discussion would not be complete without mentioning the subject of sciatic pain and the ruptured intervertebral disk. First of all, the collapsed intervertebral disk and the ruptured and protruding disk are entirely sep-



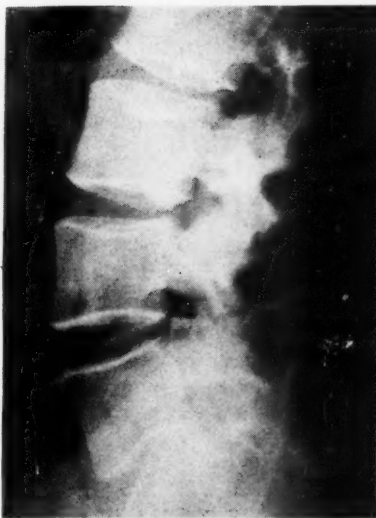


Fig. 5. Marked posterior collapse of lumbosacral disk, preoperative.

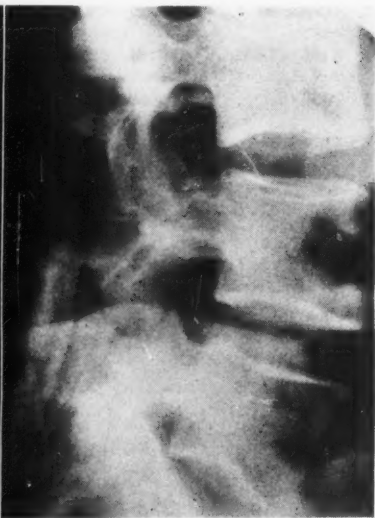


Fig. 6. Bone block fusion. Same patient as fig. 5, postoperative.

arate entities but may be, and often are, found together. The latter produces sciatic pain and usually the objective findings of hypesthesia or loss of reflexes. The collapsed intervertebral disk alone does not necessarily do so. True sciatic pain, disregarding spinal cord tumors and arachnoiditis, results from a ruptured disk or impingement of the nerve root from lessening of the diameter of the foramen due to the collapse. There is no way to differentiate clinically, and intraspinal radiology has its disadvantages and failures. Many of us feel that surgical exploration is less to be feared.

Many times we have seen the classical textbook picture of this ruptured and protruding disk become well, with conservative treatment. Who does not remember grandpa with his "sciatic rheumatism" who with time became entirely well? On the other hand it quite probably took many years. If a protrusion actually exists, we are sure it should be surgically removed. We feel that if there is a collapse of the intervertebral disk or if instability exists as shown by proper x-rays, or if it is demonstrated surgically, and if the patient is a good surgical risk, spinal fixation should be done at the time of the original surgery.

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## PROSTATECTOMY BY THE GENERAL SURGEON

### Report of Eighty-Six Cases of Retropubic Prostatectomy

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**T**HIS paper is a report on our handling of our prostatic obstruction cases due to hyperplasia of the gland over the past two and one-half years by the retropubic method. We do not claim to be urologists and wish to ask our urological friends to forgive us for giving a paper on prostatectomy. We do not think transurethral resections should be done or attempted by the general surgeon. A good percentage of our cases probably would have been handled transurethral by most urologists. We agree entirely that the small fibrotic prostate and the primary carcinoma of the prostate causing obstruction should be treated by transurethral resection. We do believe very strongly, however, that the prostatic obstruction due to hyperplasia and a large gland should be removed by retropubic prostatectomy. We believe this largely for two reasons: First, they seem to get along so nicely. The mortality and morbidity and general well-being of the patient compares very favorably with transurethral resections and certainly is preferable to suprapubic prostatectomy. Second, in our series of cases we have had 9 cases of prostatic primary carcinoma. We are not proud of 2 of these cases which were well advanced and we probably should have suspected carcinoma enough to have referred them to a urologist for transurethral resection. In other words, we missed the diagnosis on these 2. However, the other 7 were very early and we feel that the removal of the gland was the operation of choice. Our pathologic specimens have been handled in these cases by Dr. William V. Hare of the University of Mississippi, who makes numerous sections through the specimens, and he feels that these early carcinomatous changes were removed. Of course, these cases will have to be followed over a period of time to determine the final result. They are getting stilbestrol and to date have had no symptoms, obstructive or otherwise.

We will not attempt to go into the historical background of this operation. You all know that recent interest was stimulated by Dr. T. Millin of England who has had a large series of these cases since August 1945. The operative technic that we and most others are using is his. The American literature contains reports by

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Presented during the Hollywood Assembly of The Southeastern Surgical Congress, Hollywood, Fla., April 11-14, 1951.

numerous men: Drs. Grant and Lich, Presman and Rolnick, Bacon, Thomas D. Moore, Edgar Burns and others.

If I may quote Dr. Burns: "The fundamental types of bladder neck obstruction are (1) those caused by fibrosis, (2) benign prostatic hyperplasia, (3) prostatic carcinoma, and (4) those of congenital origin. In fibrotic obstructions the total size of the prostate is little or very slightly enlarged and the amount of obstructing tissue is only a few grams. Primary prostatic carcinoma which has reached the stage of obstruction has also broken through the capsule and infiltrated the tissues in the periprostatic region. Little or no disagreement will be found among American urologists that transurethral resection is the correct method of removing the obstruction in these two types."

As stated previously, we agree with him. He also states: "Prostatic hyperplasia is subject to wide variation and therein lies the reason for the variety of operative attack which has been made upon it. It seems unlikely that any one who has acquired the skill to do an adequate transurethral resection will ever abandon that method. On the other hand, its limitations should be recognized. It is our opinion that in this group of cases transurethral resection should be reserved for the small to moderate sized glands. A more satisfactory result will unquestionably be obtained if the large hypertrophic prostates are treated by some type of prostatectomy and the retropubic operation appears to have a number of advantages over other open methods."

Dr. Thomas D. Moore says: "The impression has been gained by us that the retropubic operation has definite advantages as compared to suprapubic prostatectomies. Noteworthy are the greater degree of comfort, less evidence of shock and smoother and shorter convalescence. Also, the retropubic operation appears more desirable than the transurethral operation in patients with large glands in that the operation is not as time-consuming nor as difficult. From the patient's standpoint the advantages are definite in that the operation is done in one sitting; there is less postoperative bleeding; the period of convalescence is about equal; the risk is no greater; there is less discomfort in the immediate postoperative period and the functional results in the main are superior."

*Preoperative Care.* We consider this to be of maximum importance. The case of prostatic obstruction requires a careful general physical survey. Special attention is given to his cardiovascular system. Routine urine and kidney function tests, which includes blood chemistry, NPN, and two hour phenosulfonphthalein tests, dictate largely the length of preoperative treatment. Forty-six per

cent of our cases were admitted with acute urinary retention. These, of course, had to have immediate relief of obstruction. Three of these had to have a suprapubic catheter placed in the bladder. The remainder had a Foley catheter passed through the urethra.

We feel that a digital examination of the prostate and, when indicated, a pneumocystogram, gives us a fairly accurate estimate of the size of the gland and the type of obstruction. With us in these cases of prostatic obstruction due to a large gland it is not a case of whether we will do a retropubic prostatectomy or a trans-urethral resection. We know we will do the retropubic operation if there is no pathology to contraindicate this; that is, either carcinoma of the prostate or a bladder tumor. We therefore do not cystoscope these patients with a large gland unless they have symptoms which we think might mean bladder pathology. All patients who give a history of previous bleeding are cystoscoped. We have found 3 cases in the last two and one-half years which are not included in this series to have had a malignancy of the bladder along with a large prostatic hyperplasia and these cases were referred to the urologist.

We drain all cases routinely through a Foley catheter for five days previous to surgery. This may be a debatable procedure but we have followed it. Some of these cases have been quite sick on admission with renal insufficiency as shown by high NPN, low PSP output, and toxic symptoms. One patient, S. L. D., aged 74, was admitted with an NPN of 124 mg. per 100 cc. and a 2 per cent two hour PSP. He was treated for 20 days before operation but even then his NPN got down only to 90 and his two hour PSP increased to 11 per cent. Another patient, J. P. T., aged 69, was treated for 14 days postoperatively with his NPN getting down to 84 mg. per 100 cc. and his 2 hour PSP only reaching 12 per cent. These patients were well stabilized, however, at a high level N.P.N. We feel that all of these cases with renal insufficiency have a stormy postoperative course and that it is imperative to try to get them in the best possible condition before surgery.

All of our cases had fluids forced. They all were started on penicillin and sulfonamides on admission. A number were transfused where indicated and the cardiovascular system was treated pre-operatively. They all had blood ready for surgery and postoperative treatment.

*Surgical Anatomy.* We are not attempting to give this group a detailed anatomy of the approach to the prostate retropubically or the anatomy of the prostate but rather a few points that have seemed to help us. The space or cavity of Retzius which consists

of a rather large triangular area composed of loose adipose tissue and veins, which might be classified as parietal and visceral, proceeds from the level of the umbilicus down over the pelvic floor which means the endopelvic fascia reflecting from one levator ani muscle across the prostate and on to the other levator ani. The veins in this area are all very thin-walled and with numerous anastomoses. Those lying in the prostatic capsule and on the bladder we term visceral and those loose veins about the bony pelvis we term parietal.

The capsules of the prostate have for some time been confusing to many of us. We like to think now of three capsules. 1. The outer, usually called false capsule, is composed of the reflection of the endopelvic fascia that was mentioned previously across the prostate from one levator to the other. This capsule contains in its sheath the prostatic plexus of veins. 2. A very thin capsule beneath this, which is the true capsule, consists of a thin fibromuscular sheath which blends in the prostate laterally and unites the two lateral halves, forming the anterior commissure between the lateral lobes. At the upper end the commissure blends in with the internal sphincter fibers and the bladder musculature. At the lower end it blends in with the muscular fibers of the external sphincter. 3. The surgical capsule which is within this and consists of thinned out normal prostatic tissue which has been thinned by the adenomatous growth of the hyperplasia.

The normal arterial supply of the prostate is from the inferior vesicle artery which usually sends about four branches penetrating the prostatic capsule posterior and laterally at about the level of the bladder neck. There are several abnormal vessels which may occasionally be encountered. The chief two are (1) an abnormal obturator artery which arises from the deep epigastric and sends a vesicle branch up the puboprostatic ligament to the base of the bladder anteriorly, and (2) an accessory pudental artery which arises from the internal pudental or inferior vesicle artery and passes forward along the lateral aspect of the bladder and prostate to the penis. These abnormal arteries may or may not be accompanied by their veins and when present may be injured by the surgeon. Veins from the prostate pass out from the sides to join the prostatic plexus of veins and some join directly the inferior vesicle veins. The prostatic plexus of veins arises from the deep dorsal penis vein. These veins are very extensive and lie in the false outer capsule of the prostate. They are multiple and extend upwards and near the upper part of the gland, pass laterally across the prostate, anastomosing with the obturator veins and veins draining the bulb



and corpus cavernosa, and finally as the inferior vesicle vein enters the internal iliac.

*Operative Technic.* In this we follow the technique of Millin almost completely. We have used spinal anesthesia on all cases with 12 per cent having to have supplementary sodium pentothal. All cases have been given blood during operation. We are indebted to Millin for his special instruments, including his special retractor, "T" capsule forceps, bladder spreader and open end aspirator, but we prefer a long needle holder with a small round needle in closing the prostatic capsule rather than his boomerang needle.

We emphasize a few points:

1. We prefer the transverse incision through the abdominal wall about 3 cm. above the symphysis.

2. We have found it pays to be very careful in dissecting through the space of Retzius to avoid tearing the parietal and visceral veins. This will save lots of time.

3. Careful mobilization of the prostate is then done with a small long gauze dissector and sponge sticks. This exposes the outer capsule of the prostate and if precapsular veins remain in the field they should be clamped and cut and either coagulated or ligated. Up to this point there should have been no wasted time with bleeding veins—which we did have in our first few cases. A wet sponge is then loosely packed laterally on each side to keep prevesicle fat out of the field.

4. Two sutures are then placed about the midline of the capsule on each side of the proposed incision and tied. These are used for traction as well as to help control bleeding. An incision is then made through the three capsules of the prostate down to the whitish adenomatous tissue. This is made about  $1\frac{1}{2}$  cm. below the vesicle neck and curving slightly upwards on each side of the midline. We try to make this as short as possible, first on one side and then the other, and feel that we avoid some of the veins in the endopelvic fascia by the position and shortness of the incision. The aspirator is used continuously during this stage and forceps ("T" capsular forceps preferably) clamp the capsule edges, controlling the bleeding.

5. Flat long scissors then dissect the adenomatous gland downward and laterally. The gland is grasped with a vulsellum forceps and elevated gently and the urethra is cut with long scissors. The gland then peels out usually very easily with traction and dissection with long scissors or the finger. We try to be careful here about tearing the capsule and would rather extend the incision laterally if

necessary than to tear it. So we avoid finger dissection as much as possible. Subcervical and subtrigonal adenoma are peeled out from below with the rest of the gland. The mucosal attachment to the bladder is clamped and cut and coagulated. A warm pack is placed in the prostatic bed.

6. The bladder is then thoroughly explored with the finger, any stones are removed, and any other pathology is investigated.

7. We then routinely remove a good sized wedge of tissue from the posterior vesicle neck by grasping this with a long Allis clamp and using a large loop with cutting electric current. We did not do this routinely on our early cases.

8. The prostatic bed is then inspected under direct vision for remaining small adenomata which are removed if present and for bleeding points which are coagulated if active.

9. A 22 or 24 Foley catheter is then inserted and its bag distended to the desired fullness. This water is then removed, noting the number of centimeters of distension, and the capsule is closed with a single layer of No. 0 chromic catgut in a running suture, using a long needle holder and a small round needle. We begin a suture at each lateral angle and bring them to the approximate midline tying the two sutures together. We find this easier and feel that we get our angles closed better. The two traction sutures which were placed previous to opening the capsule are tied to each other. The Foley bag is inflated and the bladder is irrigated with neutral acriflavine containing 1 per cent sodium citrate.

10. The retropubic space is irrigated, the lateral sponges removed and we still use sulfanilamide crystals sprinkled in the wound. A Penrose drain is placed down to the capsule and the wound closed with No. 0 chromic catgut interrupted sutures, bringing the drain out through our original incision in the midline. We have not done routine vas ligation.

*Postoperative Care.* These patients usually have remarkably little discomfort. We connect the catheter to a closed drainage and irrigator system when reaching the room. The solution of acriflavine and sodium citrate is used for 12 to 36 hours for irrigation. Usual supportive treatment is given with fluids, penicillin and sulfonamides routinely and early ambulation. The drain is removed in 48 to 72 hours and the catheter on the fifth day if there is no leakage. We have had to leave the catheter a few days longer on 5 cases.

In our series of cases the average age of patients was 70 with the youngest being 57 and the oldest 87. The average preoperative

stay in the hospital was six and one-half days with most of them being five days and the longest 20 days. The postoperative hospital stay averaged 11 days with most of them being eight and nine days. The shortest was seven days and the longest 30 days.

We have had no hospital deaths. One patient, a cardiovascular patient, died suddenly on the thirteenth day two days after he had been at home. This patient was seen by his local physician only after death and no postmortem examination was done, so we will have to say this could have likely been a pulmonary embolus. There have been no other infarctions or vascular complications. Two other patients have expired since surgery, both about three months later. One of these was one of our extensive carcinomata of the prostate cases and although he continued to void well he did not do well at any time postoperatively. The other case returned to the hospital three months later and died in the hospital. Autopsy revealed primary carcinoma of the pancreas.

We have had only 2 cases of hemorrhage. One of these occurred on the fourth and again on the twelfth postoperative days in the same patient. The first was rather severe and required blood transfusion, Foley catheter and bladder irrigation. His second bleeding was very mild. The other case had rather severe hemorrhage on the twenty-fifth day. Catheter had to be inserted, irrigated and left in for two days.

We have had 3 cases of leakage after the catheter was removed, requiring reinsertion for three or four days. All cases cleared up promptly. Among our first cases we had 2 that developed some obstruction that required dilatation with sounds. Each one of these had to be sounded only one time, however. Since we began excising the wedge in the posterior vesicle neck we have had no obstructive symptoms. Also in our early cases we had two patients who had a good deal of trouble with incontinence for three to five weeks. Since cutting through the urethra early before traction on the gland we have been having no real trouble with incontinence.

There have been 3 cases of pneumonia and 1 of auricular fibrillation. All of these responded to medical treatment.

We have had 4 cases of acute epididymitis, 2 severe and 2 mild. We have not done vas ligations, feeling that the antibiotics and chemotherapy would prevent this complication. The 2 severe cases, 1 of which suppurated, has about changed our mind on this, however, and we may begin doing them routinely.

Edema of the penis has occurred in 3 cases, 1 rather severe, but all cleared up very promptly and caused little trouble.

Only 2 cases have shown evidence of osteitis pubis or obturator neuritis. Both of these were mild and seemed more likely osteitis pubis. We have attempted to avoid traumatizing the periosteum of the pubis either with needle or instruments and retractors. One of these I believe was definitely from retractor trauma in an obese patient.

Seven patients were really acutely ill postoperatively. These were all cases which had shown renal insufficiency before operation. Postoperatively they showed mild uremia with some delirium and usually hiccoughs. They all required a lot of attention and care. These cases impressed upon us the importance of getting all patients in the best possible condition before surgery.

In conclusion, we who did suprapubic prostatectomies for 20 years feel that the retropubic operation has numerous advantages. 1. The approach is direct with good vision, assuring complete removal of the obstructing gland and adequate hemostasis. 2. There is relative freedom from shock allowing patients who are poor surgical risks to go through the operation. 3. A minimum amount of discomfort postoperatively allows early ambulation and we believe it reduces complications. 4. The hospital stay is short and the mortality and morbidity compares favorably with transurethral resection. 5. The patients do well. Nocturia clears up almost immediately and the urine is completely clear in from six to eight weeks. Also with complete removal we do not believe the patients will have recurrent obstruction in the future.

Finally, we again want to mention carcinoma of the prostate. We feel that any case suspicious of carcinoma should be referred to the urologist for transurethral resection. We are very much interested in following our 7 cases of early carcinoma which we are hoping will not recur and we only hope that they live long enough to have an adequate time of follow-up on them.

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## IRRADIATION DERMATITIS OF THE HANDS

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**I**RRADIATION injuries are not disappearing, but form a good percentage of conditions for which plastic surgery is required, as is evident from the numerous papers which have appeared on this subject in recent years. Important, also, is the fact that a very high percentage of carcinoma of the hand develops on the basis of an irradiation dermatitis.

The skin of the hands vies with that of the soles of the feet and the perineum in sensitivity to irradiation. In reported series of cases of irradiation dermatitis the hands are involved in some 30 to 40 per cent. Of our personal series of cases, some 60 per cent of the patients come for relief of roentgen or radium dermatitis of the hand. Of this group a very sizeable percentage is made up of doctors, dentists and radiation technicians.

There are various circumstances under which exposure to irradiation has been sustained. In most instances in our experience the exposure has been unnecessary. This is not to be construed as a criticism of irradiation therapy for conditions in which it is indicated. However, it is our feeling that irradiation therapy is seldom indicated for conditions involving the hands. The potentialities of postradiation dermatitis are so great that it seems a highly illogical treatment for the various dermatoses for which it is sometimes used, while for the treatment of malignancies of the hand the surgeon's knife is usually preferable.

Most frequently the dermatitis follows repeated minimal exposures and there are two groups of patients in this category. *One group* is made up of professional personnel who work with x-ray machines or radioactive materials as an occupation. The professional roentgenologist and radiotherapist is not so often seen any more. The present-day professional has acquired a true respect for the tools of his profession and insists on adequate protection and safeguards for himself, his assistants and technicians. We still see an occasional "gentleman of the old school" with irradiation lesions of the hands but his place has been taken by the occasional roentgenologist, the busy general surgeon or general practitioner who uses a machine in his practice. Too often he neglects to take the required precautions or, in some instances, knowingly exposes himself to fre-

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Presented during the Hollywood Assembly of The Southeastern Surgical Congress, Hollywood, Fla., April 11-14, 1951.

quent irradiation in carrying on diagnostic fluoroscopy or in setting fractures and searching for foreign bodies. It is highly hazardous



Fig. 1. Hands of a physician who used fluoroscope in diagnostic procedures and for reducing fractures over a period of 25 years. Typical lesions developed after some 10 years of exposure. The left index finger had been amputated when it failed to heal following an injury. Extensive excision and skin grafting required to rid hand of involved skin.



Fig. 2. Right hand of a dentist exposed over a period of 14 years to minute doses of irradiation in holding films in patients' mouths during roentgenography. Lesions began to appear after some nine years of exposure. Shows typical distribution on dentists; volar, radial and dorsal surfaces of index, middle and ring fingers and pad of thumb.



Fig. 3. Radium technician, exposed over a period of eight years. Initial lesions first appeared after some six years of this work. Spotty involvement with four separate squamous cell carcinomas.

to reduce fractures under the fluoroscope while the search for foreign bodies may lead to serious trouble for both patient and doctor. The dentist who takes his own dental films is likewise a not infrequent



victim of radionecrosis, but we are seeing them less frequently than before. The same applies to technicians, although we have recently had under our care two nurses with severe radium injuries, with multiple carcinomas from the same radium laboratory. We have had no experience with cases of chronic radiation dermatitis from atomic energy projects. These individuals apparently are very well protected and have profited by lessons learned in the early roentgen days, although reports of ocular damage seem to indicate that we still have something to learn. Whether or not chronic irradiation dermatitis of the hands will occur in this group, probably time only will tell. It is difficult to conceive of atomic energy workers entirely escaping the dangers of chronic irradiation dermatitis of the hands.

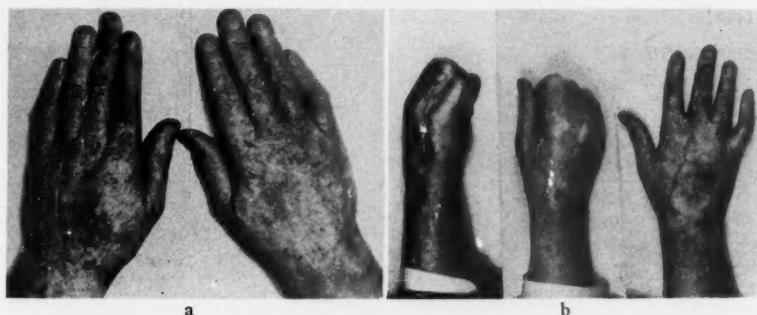


Fig. 4. Results of irradiation therapy for eczema, four treatments a year over a period of eight years. Required excision of entire dorsal skin from hands and fingers. Several areas of squamous cell carcinoma. 4a. Dorsal surface of both hands previous to excision and split skin grafts. 4b. After excision and skin grafts on right hand.

The other group of patients subjected to repeated and small doses of irradiation is composed of patients who have been treated for some chronic, usually recurring, skin disorder such as eczema, ringworm, psoriasis, occupational dermatitis or some indefinite undiagnosed dermatosis. Possibly if these patients would remain under the care of the same dermatologist everything would go along all right. However, by the very nature of their condition, recurrences take place and another physician is sought who has no knowledge of the previous therapy or if he knows of it has no knowledge of the dosage given. Be this as it may, the skin condition is usually one which is better treated by other means, since even if it responds initially to irradiation, it recurs just the same and the patient is not only not cured of the dermatitis but has an added radiodermatitis of more serious import. This is especially serious in the case of the hand, the skin of which is not only highly sensitive to x-ray and radium, but is constantly exposed to other sources of irradiation, e.g. heat, and sunlight.

A second group of patients with irradiation injuries to the hand has received acute overexposure during a relatively short period of time. Occasionally an accident may occur to the x-ray apparatus, a filter may be left out, a leak obtains, a timer is out of repair or an unpredictable voltage change occurs on the line. But these accidents are relatively rare. More often in our experience it is fluoroscopic overexposure which is at fault. A foreign body eludes the probing forceps and the search is prolonged beyond the safe period with risk of an acute burn to both surgeon and patient. Diagnostic fluoroscopy is possibly a source of trouble but we have not seen it on the hand. Acute overexposure to atomic radiation has been reported by Brown, McDowell and Fryer in three workers at the Eniwetok trials.

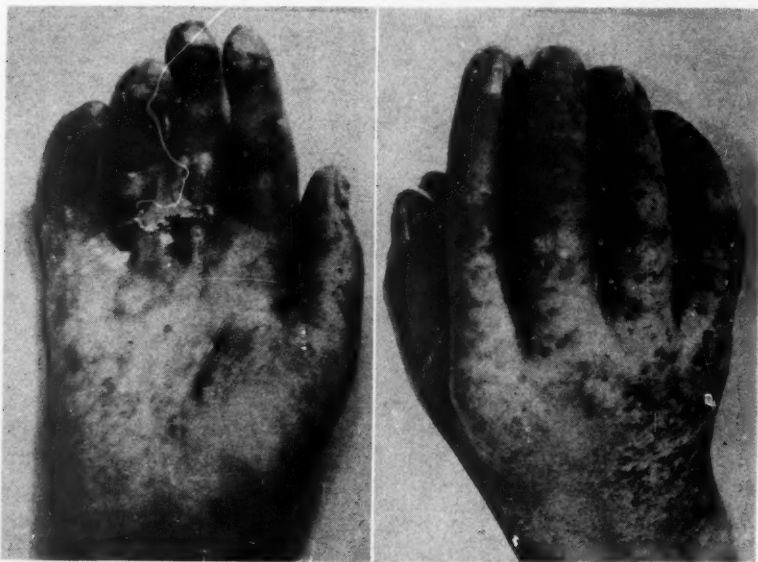


Fig. 5. Roentgen dermatitis of two years' duration following two treatments for fungus infection. Hand amputated (elsewhere) at insistence of patient.

We have seen a few cases of acute injuries to the hands from the use of x-ray for industrial purposes. These are quite rare today since protective rules are likely to be enforced.

A third group of patients present themselves with radionecrosis following destructive irradiation. In some instances a malignant tumor has been destroyed and is replaced by a dermatitis which may itself show cancer. In other instances nonmalignant tumor masses such as warts, moles, nevi or angiomas, have been treated, some-

times successfully, sometimes unsuccessfully. It has seemed to us that even in those cases in which irradiation may be indicated elsewhere on the body, it is best not carried out on the hand, since irradiation sufficient to destroy a growth may lead to damage to deeper structures and is liable to be followed by an ulcer which will later require excision.



Fig. 6. Result of 30 to 40 x-ray treatments over a period of five years for ring-worm. Extensive resection and skin grafting required. Precancerous stage.

Depilatory x-ray, which fortunately does not seem to be extensively practiced nowadays, does not often involve the hand but may involve the forearm and wrist.

A fourth group of patients develop irradiation damage from deep therapy. Deep therapy is usually so screened that the skin is not too badly damaged. However, the abdominal and sacral skin may break down over ports of administration for pelvic malignancy. The condition is rare on the hand since indications here do not obtain for deep therapy; we have, however, seen 1 patient who had irradiation therapy for an arthritis of the wrist.

Finally, radiation dermatitis may follow the use of x-ray in treatment of an infection. This, too, is quite rare on the hand, as it seems also to be elsewhere on the body.

The pathologic changes produced in the skin by the action of the rays are quite typical, particularly in the later phases. The early acute stages resemble the acute burn from various causes. Later, however, chronic changes develop which are typical and pathognomic of irradiation damage. These chronic changes may follow

the acute burn or they may develop slowly months or even many years after the initial exposure. The acute phase may subside gradually under conservative management, but occasionally goes over into an ulcerating process which demands surgical treatment. The chronic stage, however, is the one with which the surgeon has to deal. This stage of the process is not amenable to conservative therapy. The dry, cracked skin may be kept moderately comfortable by salves and greases; it may be protected from trauma (chemical, mechanical and irradiation), but it never heals and it deteriorates progressively. The irradiation has seriously interfered with its blood supply, rendered it inelastic and dry, and more serious yet, has exerted a carcinogenic effect upon the epithelial cells themselves. Ulceration is prone to occur, chronic infection develops about the nails and in tiny cracks in the skin and it is extremely



Fig. 7. Acute reaction following a 30 to 40 minute fruitless fluoroscopic search for a tiny steel foreign body. Area completely excised and a split thickness graft applied immediately. 7a. Before excision. 7b. After excision and split graft.

vulnerable to trauma and especially so to other types of irradiation. Carcinoma may occur in multiple areas throughout the damaged skin.

The occurrence of carcinoma in irradiated skin is quite well recognized. It is probably, however, not so fully realized how frequent an occurrence it is. It is the frequently repeated irradiation, with

small exposures over a prolonged period of time, that is more likely to lead to carcinoma than is the more acute exposure. Thus in the group composed of physicians, dentists, radiologists and radiologic technicians carcinoma is observed in 58 per cent. In those patients who have had irradiation therapy for some sort of recurring skin disease, carcinoma is seen to develop in over 66 per cent. Obviously, the patients we see are having real trouble with their hands and one is forced to conclude that there must be many patients with mild degrees of irradiation dermatitis which is kept under relative control and comfortable by greasy salves and ointments for long periods of time. On the other hand, the overexposure, the destructive irradiation for warts, deep therapy and therapy for infection does not so often lead to carcinoma, although it may develop in these areas as is shown in the table.

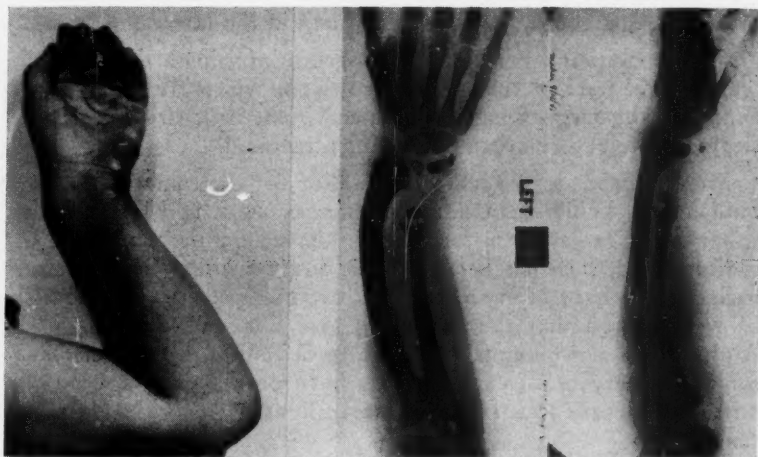


Fig. 8. Epiphyseal damage to ulna and chronic irradiation dermatitis in a girl of 6 subsequent to radium therapy for strawberry nevus at 1 year of age.

The treatment of chronic irradiation dermatitis on the hand as other parts of the body is excision of the damaged skin. The difficulties of treatment concern the decision as to amount to excise and technical difficulties of skin replacement. On the hand, as may frequently occur elsewhere, adequate excision may expose such structures as bones, joints and tendons, or these structures may be actually involved in the irradiation damage or, what is more frequently the case, in the infection which is certain to develop about ulcerating areas.

When operation is undertaken early before ulceration and malig-

nancy have developed, quite extensive excision may be accomplished and the resultant defects may be replaced by split skin grafts. This applies to all surfaces of the hand, dorsum as well as palm.

In some cases small keratotic plaques may be excised and the defect simply sutured. This occurs especially on the hands of physicians and dentists whose exposure has been largely adventitious and in which the involvement may be very spotty.

With serious changes about the nails it is often necessary to remove the entire nail bed and to graft over the resultant defect. These areas heal very slowly and are painful because of the infection which is always present. It is sometimes necessary to amputate the tips, not necessarily because of malignancy, but because of the infectious invasion of the terminal phalanx and interphalangeal joint. Skin flaps are occasionally required on the hand, particularly where the dorsum is deeply involved and in the late case.

If the condition is permitted to progress, infection becomes firmly seated in the part, ulcerating lesions develop which are often malignant, and the surgeon must often spend some little time securing a clean surface before operation can be attempted.

Mention is made of further irradiation for the condition only to condemn it. While it would seem that no one would logically use either x-ray radiation or radium irradiation in the treatment of radionecrosis, such has been the case and we still occasionally see patients who have been treated with radon ointment. It must also be remembered that the irradiated skin is sensitive not only to Alpha, Beta and Gamma rays, but to infra red, ultra violet and sunlight. Very acute exacerbations have been seen following ill-advised exposure to infra red, quartz light or to heavy doses of sunlight.

The susceptibility to irradiation is associated also with marked vulnerability to other types of injury, mechanical, chemical and bacteriologic. A serious ulcer may follow a minor abrasion, harsh chemicals may lead to breakdown of skin which never subsequently heals, while the difficulty of clearing up an infection in these lesions is well known by anyone who has attempted to treat them.

The occurrence of malignancy alters somewhat the nature of the surgery, although actually unless there has been gross delay in seeking treatment amputations may be kept at a minimum. The carcinoma which develops in cases of irradiation dermatitis is almost always squamous cell and as such possesses the potentiality of all squamous cell tumors. However, the changes which occur in the skin and subcutaneous tissues following irradiation tend to confine the malignancy to its immediate locale for quite some time and local



TABLE OF PATIENTS WITH IRRADIATION DERMATITIS OF THE HANDS GROUPED ACCORDING TO NATURE OF EXPOSURE

GROUP	Total	Benign	Malign.	% Malign.
IA (Frequently repeated exposure—adventitious)				
Physicians	25	10	15	60%
Dentists	12	5	7	58%
Prof. Radiologists	5	3	2	40%
Technicians	4	1	3	75%
Total IA	46	19	27	58+%
IB (Frequently repeated—therapeutic)				
Eczema	4	0	4	100%
"Dermatitis"	2	1	1	50%
Ringworm	3	1	2	66 $\frac{2}{3}$ %
Chemical derm.	1	0	1	100%
Psoriasis	2	2	0	0
Total IB	12	4	8	66 $\frac{2}{3}$ %
IA+IB	58	23	35	60%
II (Acute exposure)				
Fluoroscopic	7	7	0	0
Other	2	1	1	50%
Total II	9	8	1	11%
III (Destructive irradiation)				
Warts	9	7	2	22+%
Various tumors	3	3	0	0
Keloid and scar	2	2	0	0
Total III	14	12	2	16.6%
IV (Deep therapy)				
Arthritis	1	1	0	0
V (Infection)				
	4	3	1	25%
ALL GROUPS	86	47	39	45+%

excision usually suffices to remove it adequately. If the subcutaneous tissues, and especially if bone has been involved, amputation is called for but often here one can amputate fingers or perform partial hand amputation without the necessity of a complete amputation of the hand or forearm. In our experience most of these carcinomas are of low grade malignancy; 85 per cent in Grade I, a further 13 per cent in Grade II and 2 per cent in Grade III, with none in our series in Grade IV.



Fig. 9. Scarring, dermatitis and marked telangiectasis following radium irradiation of a keloid which followed fulguration of a wart.

There has been some dispute about routine lymph node dissection in the presence of a roentgen carcinoma of the hand. Where there is palpable enlargement of the axillary nodes, an axillary dissection appears to be indicated, although the enlargement may simply be due to infection. Without palpable nodes it seems doubtful if routine dissection is necessary and we do not practice it.

The most important feature of irradiation dermatitis is its prevention. Few of the patients with radionecrosis of the hands whom we have seen had conditions in which irradiation was indicated. The majority have been professionals and nowadays such exposure is due to carelessness or disregard of known precautionary measures. The use of x-rays in chronic, recurring types of skin disease would seem highly illogical, since few of these diseases are cured by the irradiation, and the repeated continuance of the treatment is

hazardous. Acute overexposure from fluoroscopy is obviously not indicated and casts real doubt on the justification of fluoroscopic procedures except diagnostic fluoroscopy in expert hands. Tumors and infections of the hands are all better treated by other means than irradiation. The problem is not one which applies to the hand alone but to irradiation elsewhere on the body. The soles of the feet, the perineum, the face and neck, the abdominal wall and back may all break down following exposure to x-rays and radium. The numbers of patients seen yearly because of this catastrophe makes one realize that the situation is one which still deserves serious attention.

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## CHRONIC HYPERTHYROIDISM\*

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THERE are many patients seeking relief from symptoms of chronic hyperthyroidism, or chronic thyrotoxicosis. The diagnosis is being overlooked by the physician because the routine laboratory tests are either negative or they are not sufficiently positive to enable the physician to make a definite diagnosis of thyrotoxicosis based on laboratory findings.

For the last 25 years, or longer, I<sup>1,2</sup> have been calling attention to patients with mild symptoms of thyrotoxicosis, whose basal metabolic readings are normal or subnormal and who are relieved of these symptoms by thyroidectomy. The majority of these patients are usually classified as having nodular nontoxic goiters. I have applied the term "chronic hyperthyroidism" to such patients.

The symptoms, such as nervousness, palpitation of the heart, irritability, slight tachycardia, and at times loss of weight, develop very insidiously and the patient has difficulty in stating just when these symptoms became noticeable. Usually the goiters have been present for several years when the patients notice the symptoms, and present themselves for treatment. Ninety-two per cent of my series were women.

Clute<sup>3</sup> in 1929 wrote about "borderline hyperthyroidism," reporting a small group of cases with low basal metabolic readings. Gilman and Kay<sup>4</sup> in 1930 reported a series of patients with toxic symptoms and low metabolic readings who were relieved by operation. W. A. Plummer<sup>5</sup> in 1931 and Troell<sup>6</sup> in 1932 reported similar cases. Gordon and Graham<sup>7</sup> in 1934 reported two groups of cases, one group of 17 cases of diffuse toxic goiter, and another group of 54 cases of nodular toxic goiter in which the basal metabolic reading was consistently low or even subnormal in both groups. Link in 1943 published an excellent paper, "Mild Chronic Thyroid Disease." Searls<sup>8</sup> in 1935 read a paper in which he reported that after surgical removal of the adenomatous tissue there was often noted a rise in the basal metabolic reading. Young<sup>10</sup> in 1937 reported a series of cases of "chronic hyperthyroidism." Among other cases, I reported 1 in a patient with toxic symptoms whose basal metabolic reading was minus 37 per cent. After surgery the basal metabolic rate rose to minus 12 per cent.

Crotti<sup>11</sup> and other writers have reported similar experiences.

\*Presidential address presented during the American Goiter Association meeting, Columbus, Ohio, May, 1951.

Crotti in his paper<sup>11</sup> stated, "It seems inconsistent to say that thyrotoxicosis may be present coincidentally with hypometabolism. To be sure, in the majority of cases of thyrotoxicosis hypermetabolism is present, the metabolic elevation being usually in direct proportion to the severity of the disease; but this is by no means always a fact." Crotti is also responsible for the statement that "hypermetabolism and hypometabolism are in no way synonymous with hyperthyroidism and hypothyroidism."

We all realize that the basal metabolic reading is not always to be depended upon. In fact, in a recent survey of our cases there was a 22.2 per cent error.<sup>18</sup>

Merrill Foote,<sup>12</sup> in an excellent paper on metabolism, calls attention to the unreliability of the basal metabolic rate—there being many conditions other than thyrotoxicosis which cause an increase in the basal metabolic reading. Any condition which causes rapid respiration, such as emotional states, exercise, the menstrual cycle, cardiac disorders, diabetes, tuberculosis, leukemia, anemia, disorders of the pituitary and adrenal glands, and any disease accompanied by fever, will result in an increase in the basal metabolic reading. In addition there are many mechanical and technical errors which will play a role in producing increased consumption of oxygen; such as an inaccurate adjustment of the breathing tube in the patient's mouth or the improper application of the clip on the nose, faulty flutter valves, leaking tubes, lack of cooperation of patients and ignorance or carelessness on the part of some technicians. Dr. Foote very wisely states that "basal metabolic readings will never replace clinical judgment of the physician or surgeon in charge." The necessity of sound clinical judgment and experienced observation in making a diagnosis of hyperthyroidism should be stressed. If one operates unnecessarily on patients with neurocirculatory asthenia, or other neuroses because they have tachycardia, choking sensation, and an elevated basal metabolic reading, they will, in all probability, be far worse after surgery. Dr. Bartels<sup>13</sup> suggests that a patient, in whom you doubt the accuracy of the basal metabolic reading, be given a pentothal anesthetic, and that a basal metabolic reading be made while the patient is anesthetized. He believes that, in this way, you will probably get an accurate reading not influenced by neuroses.

Chesky and Schmidt<sup>14</sup> made a study of 100 patients having chronic thyrotoxicosis without elevated basal metabolic readings and came to the conclusion that the clinical picture of hyperthyroidism was probably due to "a perverted secretion rather than an excess of normal secretion." They then took the goiter which had been removed from one of these chronically toxic patients who had

tachycardia, palpitation, and nervousness, and whose basal metabolic reading was plus 8 per cent, and whose pulse rate was 96 per minute, made an extract from this gland, which was fed to 10 thyroidectomized rats with the result that it caused a marked increase in the pulse rate in every rat; yet did not cause an increase in the oxygen consumption.

John Hertz<sup>15</sup> of Copenhagen, in a study of cardiac symptoms of thyrotoxicosis, found that these symptoms occurred most often in nodular goiters, and stated that cardiovascular symptoms, even auricular fibrillation, do not constitute any contraindications for operations, but that they strengthen an indication already present.

The late Dr. Arthur E. Hertzler,<sup>16</sup> "The Horse and Buggy Doctor," in his book, "Diseases of the Thyroid Gland," published (by Paul B. Hoeber) in 1941, greatly honored me by heading two chapters, one, "The Chronic Goiter of Davison," and the other, "The Acute Goiter of Davison."

Although the terms "acute" and "chronic" are not usually used when speaking of goiters, we all realize that diffuse goiters often develop suddenly or have been present only a few weeks or months. They are often preceded by some psychic trauma and may run an acute course. The chronically toxic goiter occurs most often in the so-called adenoma of long standing. Too often the physician has a basal metabolic reading made, and upon finding it normal or subnormal, and in spite of the obvious presence of the goiter, an increase in the pulse rate, palpitation of the heart, increased nervousness, irritability, and in some cases loss of weight, the patient is told, "The machine says, 'no'." The patient drifts from doctor to doctor seeking relief from symptoms which become more and more distressing as time passes. The machine used in making metabolic readings cannot be relied upon to make a diagnosis of chronic hyperthyroidism. Hertzler stated that "the doctor should have more sense than a tin can." Many of these women are in the menopausal age, and we must attempt to differentiate between the nervous symptoms of menopause and thyrotoxicosis, or realize that they may, and often do, have both conditions at the same time. We must remember that basal metabolic readings measure the toxicity of cellular hyperplasia with increased metabolism, but do not measure the toxicity of degeneration, which is not accompanied by increased metabolism and likewise gives no warning of the progress toward a damaged heart. All patients with goiters tend to come to a fatal end, either by carcinoma, toxemia or heart disease.

We had hoped that the diagnosis of chronic hyperthyroidism might be proved by the protein-bound iodine determinations as sug-



gested by Curtis,<sup>17</sup> but we are unable to correlate these determinations with the clinical findings of chronic hyperthyroidism. In our experience the protein-bound iodine determinations and the basal metabolic rate run a somewhat parallel course.

I have previously called the attention of the members of this association to this clinical diagnosis: "chronic hyperthyroidism." I have reported smaller series of cases in the past, and now I would like to submit for your consideration a series of 200 case reports covering a period of time from 1941 to 1950. The females predominate. There were a total of 184 females and 16 males. There were 154 nodular type goiters and 46 diffuse. The ages varied from 17 to 86 years. The duration of the presence of the goiter varied a great deal. Often the patient never knew she had a goiter until she was told so by the examining physician.

We, of course, all know that goiters are usually present for a much longer time than patients usually state, particularly the nodular types which as a rule grow very slowly, and are most often unnoticed by the average patient until symptoms appear. The duration of symptoms also varies a great deal, but nervousness is the outstanding symptom. There are many conditions, other than thyrotoxicosis, which may cause or influence a woman to be nervous. In the younger woman, menstruation, a quarrel with a boy friend or with husband, financial troubles, or sick babies, may aggravate her nervousness. In the older woman, especially the menopausal changes, as well as domestic troubles, may aggravate her nervousness. The majority of these chronically toxic patients are in the age group of 30 to 50 years and are often influenced by the nervous symptoms of menopause. The presence of a goiter with increased nervousness, irritability, tachycardia, palpitation, tremor of the hands and at times loss of weight, will help the physician to arrive at a diagnosis. The symptom of choking is not of value unless the goiter is large enough to produce obstructive symptoms. In patients with chronic hyperthyroidism suffering also from the menopausal syndrome, treatment should be given for the latter condition before resorting to surgery. Tachycardia is not always present when the patient is at rest, but on exertion or under influence of excitement, there is a relative tachycardia. Permanent heart damage occurs in a few cases. The patient may fatigue easily. She may be emotional and is easily upset. She may have insomnia. She seldom has exophthalmos but often has eye signs consisting of a definite stare.

The only curative treatment is surgical removal of the gland, and the majority are relieved permanently by subtotal or total thyroidectomies. A great majority of these patients have nodular goiters which should be removed surgically whether they are toxic or not.

We feel that medical treatment is contraindicated, and that surgery is the treatment of choice.

Eighty-six per cent of our cases were relieved of symptoms and 14 per cent were improved by thyroidectomy. Of this group of cases, the symptoms in only 2 patients recurred. There were no deaths in this series. The majority of the cases of patients reported as improved but not cured was in the menopausal group. Several patients after thyroidectomy showed slight evidence of myxedema, which was corrected by the administration of thyroid extract. Following surgical removal of these chronic goiters, the majority of the patients returned and enthusiastically reported that they felt better than they had in years.

#### SUMMARY

We have reported a series of 200 cases. Clinically these patients were mildly toxic with nervousness, palpitation, tachycardia, tremor, and some had lost weight. All metabolic tests were normal or subnormal. And yet, the great majority of them were relieved of their symptoms by thyroidectomy.

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## SKIN GRAFTING IN THE TREATMENT OF EXTENSIVE PILONIDAL DISEASE AND ANAL FISTULA

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**T**HE purpose of this paper is to emphasize the value of skin grafting as an effective means of curing extensive, persistent pilonidal disease and anal fistula.

Many general surgeons are familiar with the pilonidal sinus or chronic ischiorectal abscess secondary to anal fistula which has defied the measures usually employed to bring about a cure. In such cases the patient is discouraged and distressed by this painful lesion which often has been worsened by repeated attempts at surgical correction. Examination will disclose a widespread, heavily scarred and sinus ridden area of skin stemming from the region of the original sinus or abscess. Efforts of the surrounding skin to cover the defect produce "bridging" of the epithelium. This epithelium is thin and shiny; the underlying scar thick and almost avascular, while the whole is under tension due to contraction of the scar. Such tissues are highly vulnerable to infection and trauma. The proximity of the lesion to the anus with consequent repeated fecal contamination combines with the above factors to account for the failure of these lesions to heal as well as for their tendency to "break down." In the female, soiling by vaginal discharges and urine further retards the healing process. Though infrequent, such cases are still being encountered, since the present management<sup>1</sup> of pilonidal disease is considerably short of the ideal.<sup>2</sup> The recurrence rate in anal fistula is also high.

During the last five years we have had under our care at Riverside Hospital 3 patients presenting difficult lesions such as have just been described. Each of these patients had undergone several previous operations over a period ranging from three to six years. These patients had become progressively worse with each additional operation. Their morale was low as a result of prolonged worry and physical discomfort. It was apparent that a different therapeutic approach had to be devised if these patients were to be relieved of their disease.

The first of these 3 patients was seen in 1946. At that time the sulfonamides and penicillin were available. It seemed feasible to try a skin graft to bring about healing, relying on the effectiveness of the above drugs to prevent sepsis in the grafted area.

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Presented during the Hollywood Assembly of The Southeastern Surgical Congress, Hollywood, Fla., April 11-14, 1951.

The employment of skin grafts to heal such lesions as have been described above is not original. The procedure has been referred to in the recent literature a number of times<sup>1,2,3,5,6</sup> but specific information is sketchy and the number of reported cases small. For this reason and since our results were uniformly good, the following cases are being reported in some detail with the hope that these experiences will prove of value.

#### REPORT OF CASES

CASE 1. J. F. S., a white male, gave a history of having had a pilonidal sinus excised in March 1941 at the age of 17 years. A draining sinus remained and persisted in spite of x-ray therapy to the area. In September 1942 the lesion, consisting of several sinuses, was again excised, being packed open a second time. Healing was not complete. The scar and draining sinuses were excised again in July 1943, the wound being closed with cotton sutures. Sepsis intervened and a sinus persisted, extending downward toward the anus. This tract was excised to within 2 cm. of the anus in December 1943 and the wound left to granulate in. Again the wound did not heal. In June 1946 it covered an area 15 cm. long and up to 4 cm. wide. This area was excised and the wound closed with tantalum wire. Postoperative infection again set in, leaving a large septic defect.



Fig. 1, case 1. Healed wound shown five years after grafting. Large graft clearly visible.

The patient was seen in consultation July 12, 1946. He was 22 years of age and weighed 180 pounds. Examination showed a septic, granulating wound measuring 15 cm. in length and 7 cm. in width. The wound was deep,

had heavy scarring about its edges, and extended inferiorly almost to the anal margin. Any type of operative closure was obviously impossible because of the loss of tissue. It occurred to us that a skin graft would offer a fair chance of success. We were not aware that grafting of this type of lesion had been reported previously.<sup>3</sup>

The patient was hospitalized immediately, infected granulation tissue and scarred areas being excised the same day (July 12, 1946). Warm saline compresses were applied continuously. Penicillin 20,000 units and sulfadiazine 1 Gm., each every four hours, were ordered. Three days later, the wound appearing clean, a split thickness graft was taken from the right axilla with the Padgett dermatome. The axilla was selected as the donor site because it was the only available skin which was not thickly covered with hair. A full drum (4 by 8 inches) of skin was required to cover the wound surface. The graft was laid in the defect, sulfanilamide crystals lightly applied and the whole covered with a thin layer of vaseline gauze. No sutures were used. Dry gauze fluffs were firmly packed over the graft and a snug dressing applied to exert pressure of the graft and prevent its slipping. Penicillin and sulfadiazine were continued for five days postoperatively. During that time the patient was kept prone and bowel movements were discouraged. An enema was given on the fifth day after operation and the dressing changed. There was no infection and the graft was viable. The patient was discharged July 31, 16 days after grafting, with the wound completely healed. The graft took in its entirety. The patient is employed by the city electric department, is exposed to the same amount of trauma as the average individual, and has never had any symptoms referable to the grafted area. He has been followed five years. A photograph taken several weeks ago shows the area as it appears at this time (fig. 1).

CASE 2. F. S. B., a 35 year old white male, was admitted to Riverside Hospital on Jan. 19, 1948, because of a chronic draining pilonidal sinus and a chronic draining ulcer on the medial aspect of the upper right thigh. His duties as a postman required that he ride a bicycle which he found rather painful because of the lesions mentioned. Eleven years previously (1937) he had a pilonidal abscess which was incised by his local physician. The lesion did not completely heal. Draining sinuses appeared, one near the anus, one on the medial aspect of the left buttocks and one over the sacrum in the midline. These sinuses apparently had no relation to the ulcer of the right thigh which was of more recent origin. The latter was cured by excision and primary closure. The pilonidal sinus with its ramifications was excised on Jan. 22, 1948, leaving a wound which extended from the anal region well up onto the sacrum and out into the left buttocks. The anal sphincter was exposed inferiorly, the wound being wide and deep. The defect was packed open with iodoform gauze and was dressed every other day. A microscopic study of the removed tissue showed infected sinus tract and cyst wall.

The patient received 100,000 units of penicillin every three hours and sulfadiazine 1 Gm. every four hours from the day of admission. On Feb. 4, 1948, clean granulations being present, a split thickness dermatone graft was applied to the wound. The graft was taken from the right scapula region. It was sutured at the four cardinal points to the wound margins and covered with a thin layer of vaseline gauze. Then a pressure dressing of mechanic's waste was applied to keep the graft in snug contact with the wound surfaces.

Healing was without incident. Penicillin and sulfadiazine were discontinued five days after grafting. A dressing at that time showed a clean, viable graft.

The patient was discharged completely healed on Feb. 14, 1948, 10 days after grafting. He rides a bicycle a good part of each day in his occupation, thus subjecting the grafted area to considerable trauma. He is well to date and has had no symptoms referable to the graft at any time. The following photograph shows the graft as it now appears (fig. 2).



Fig. 2, case 2. Healed wound three years after grafting showing graft extending from the anus up onto the sacrum and partly out into the left buttocks. Such grafts shrink in size about 30 to 40 per cent during the healing process. The original size of the grafts and wounds was considerably greater than these photographs suggest.



Fig. 3, case 3. Healed wound three years after grafting. The proximity of the graft to the anal margin is clear. The slit in the midst of the graft represents the remnant of the tunnel up under the sacrum which was grafted.

CASE 3. G. A. S., a 33 year old white female, gave a history of constipation which developed in 1941. A diagnosis of granulomatous rectal stricture was made at that time. This was followed by a series of ischiorectal abscesses requiring incision and drainage. In 1947 the patient complained of a draining perianal sinus, weight loss, and malaise. Sigmoidoscopy showed no stricture but revealed an anal fistula. This fistula connected with one tract leading posteriorly up under the coccyx and another leading anteriorly toward the left labia. Much scarring was noted about the anal canal. A Frei test was negative. *Trichomonas vaginalis* organisms were found in a vaginal smear. On Feb. 11, 1947, the sinus tracts were laid open, all granulations and scar tissue was excised. The patient was discharged with a draining sinus in March 1947. This sinus, which led up under the coccyx, would not heal. In May 1947 the coccyx was removed and the entire sinus tract thus exposed was resected widely. The dissection was carried up under the inferior border of the sacrum. The wound was packed and allowed to granulate. Microscopic



study of the removed tissues showed nonspecific chronic inflammatory reaction.

Still the wound refused to heal. Examination on February 27 showed thick scar tissue around the anus and deep scar running upward to terminate in a granulating, dirty, infected sinus, the upper end of which extended beneath the inferior border of the sacrum. The patient was hospitalized and on February 28 the scar and sinus tract were excised completely. The posterior wall of the rectum was exposed for about 6 cm. at the conclusion of this dissection. An iodoform gauze pack was placed in the wound. The patient was started on penicillin 50,000 units every three hours and sulfadiazine 1 Gm. every four hours. Three days later, on March 2, a split thickness graft was taken from the right buttocks with the dermatome. A full drum (4 by 8 inches) of skin was required to cover the wound. The edges of the graft were anchored to the wound margins with a fine silk, the graft covered lightly with vaseline gauze and a firm fluff gauze dressing applied. The tunnel extending up under the sacrum and which measured about 5 by 4 by 4 cm. was lined with the same type of graft. Gauze, packed snugly against this graft, served to hold it in place.

The wound was dressed on the seventh postoperative day revealing a viable graft and no infection. Penicillin and sulfadiazine were stopped. The patient was discharged March 17, 1948, 15 days after grafting, with her wound cleanly healed. She has remained free of symptoms to date, has gained weight, and is well pleased. The appearance of her graft at this time is shown in the following photograph (fig. 3).

During 1949 skin grafts were used in 2 additional cases, one of pilonidal disease and 1 of anal fistula. These were both primary conditions and the defects not so extensive as those already described. Thiersch grafts were used in both cases because of the limited size of the defects. The wounds would have healed, no doubt, in both instances without the aid of grafts. The purpose of grafting here was to shorten the healing time and to secure healing with a minimum of scar tissue. It is felt that the less scar tissue produced, the more durable is the healed area.

These grafts were successful. The patients have remained well and free from symptoms to date (two years). The suggestion is offered that the employment of skin grafts in this region be extended to include cases in which, for some reason, the wounds have not been closed primarily and when there is a granulating area of any extent which will be slow to heal.

#### COMMENT

It has been suggested previously<sup>4</sup> that pilonidal disease should not be considered cured until the patient has been followed postoperatively for at least two years without evidence of recurrence. One of the patients in our group has been followed five years, 2 for three years and 2 followed for two years. All of these patients have remained healed and free of symptoms. We therefore feel justified in considering their lesions cured.

Our group of cases is small. However, when considered together with the cases reported by others, the experience is sufficient to permit the drawing of some conclusions.

Turell<sup>6</sup> has stated that skin grafting is feasible to secure healing

in recurrent cases, such as are under discussion, with extensive defects but that these grafts "cannot withstand the strain incident to full military duty status or corresponding stress and strain in civilian pursuit: the grafted skin is affected easily (excoriation, fissures) by slight trauma."<sup>6</sup> Our experience is to the contrary. Other observers have not mentioned any tendency for these grafts to break down. There is no reason to expect that grafts here should be any less durable than similar grafts elsewhere on the body. Turell<sup>6</sup> did not cite any specific experiences in his communication.

There has been some question relative to the effectiveness of sulfonamides and antibiotics in conjunction with the operative treatment of pilonidal disease. It will be noted that penicillin and sulfadiazine were given during the preoperative and postoperative periods in each of the 3 cases which we have reported in detail. We feel that these drugs definitely enhance the chances of success of grafting in such wounds and strongly advise their employment. The newer antibiotics such as aureomycin, chloromycetin and terramycin were not available at the time our patients were treated. They should prove most valuable in such cases.

The question arises as to whether grafts should be applied at the time the lesion is excised or whether grafting should be delayed until granulations appear in the wound. We have followed the latter practice for several reasons. First, the wound is contaminated at the time of the excision of the sinus since the sinus is grossly septic. Grafting with split thickness sheets of skin is not advisable in the presence of infection. Second, the wounds are usually irregular at the time of operation so that no flat or even surface is presented. Many of these irregularities are smoothed over by granulation tissue within three to seven days. By delaying it is thus easier to apply the graft to the wound surface and keep it in contact. Also the base of the wound often consists of the fascia over the sacrum which offers a poor bed for a graft. Granulations appear quickly over this fascia so that an adequate blood supply is present within a week or less. The third reason is the oozing of blood and serum which is particularly difficult to control in wounds where infected scar has been excised. Floating of the graft due to hematoma can be avoided if the grafting is delayed a few days. However, others have grafted immediately with successful takes,<sup>1</sup> and feel that this practice is desirable. Further experience is necessary to settle this question.

The prompt healing and consequently short convalescent period experienced after grafting is most gratifying to the patient, the doctor and the hospital. One of our patients was discharged 10

days, one 15 days, and the other 16 days after skin grafting. Healing was complete in each instance at the time of discharge. The average hospitalization for patients with pilonidal disease treated by open operation was said to be 52 days and by the closed method 33 days by Weeks and Young.<sup>3</sup> Their cases were for the most part uncomplicated which fact accentuates the contrast between the convalescent time of the grafted patients as compared with patients treated otherwise.

A search of the literature of the past 10 years revealed only one paper dealing exclusively with the subject of skin grafting in the treatment of pilonidal disease.<sup>1</sup> In this communication, published in 1947, Hubey, Mustard, and Stiefel point out the advantages of grafting large defects produced by excision of recurrent pilonidal disease and go on to give in detail the technic of this procedure as well as the pre and postoperative management. The procedure employed in our cases differs only in minor respects from that described by the above authors. They made no reference to any specific cases and did not state upon what experience they based their conclusions.

Larsen,<sup>2</sup> in an army experience with 265 cases of pilonidal disease treated surgically, employed skin grafts in 11 cases. None of these grafts were successful. He advised against grafting because infection could not be controlled. These 11 patients were operated upon about 1942 before penicillin and other antibiotics were available. We feel, as already stated, that the antibiotics and sulfonamides in combination will effectively control infection, and that Larsen's objection to grafting probably is no longer valid.

Weeks and Young,<sup>3</sup> reporting an army experience with 200 cases of pilonidal disease treated surgically, advocate the use of skin grafts in cases where healing has not been obtained after the first operation and where the wounds are extensive. They state that split thickness grafts will take on healthy granulations in this area. They cite 1 case in which healing was brought about by grafting. This patient had multiple draining sinuses, the lesion being of three years' duration. Their further experience is not stated.

Jackman and McQuarrie<sup>5</sup> in 1949 called attention to the occurrence of hidradenitis suppurativa in the perianal region. They advocate surgical excision as the best mode of treatment and recommended closure by skin grafts when the denuded area is extensive. One case is illustrated in their paper. Reference to hidradenitis suppurativa of the perianal region is mentioned merely to point out that skin grafting is a feasible means of healing large wounds in this general region regardless of their etiology.

Our series of 5 cases, though small, comprises the largest group of such cases successfully grafted which has been reported to date. It is probable that other observers have had as many or more such cases but have neglected to report them.

#### SUMMARY AND CONCLUSIONS

1. Wide excision followed by the application of split thickness skin grafts is advocated to secure healing in extensive and persistent sinuses and fistulas about the perineal and coccygeal regions.
2. Five cases are reported in each of which skin grafting was successful. The principles followed in the management of these cases are discussed.
3. References are made to reports in the literature dealing with the use of skin grafts in the treatment of such lesions.

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## SMALL INTESTINAL OBSTRUCTION DUE TO ENDOMETRIOSIS

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**E**NDOMETRIOSIS has been reported with increasing frequency in the surgical and gynecological literature of recent years. Reports generally have been confined to the effects upon the pelvic organs. It has been described, however, as occurring as remote from its usual sites as the umbilicus, breast, thigh and even the nose. Symptomatic involvement of the small intestine is uncommon but several large series of endometriosis have included a few cases located in the ileum. Masson reported 2 cases affecting the ileum in a total of 599. Counsellor found 20 cases involving the ileum in 754 patients showing endometriosis in a total of 1,434 locations. The cases generally were associated with and incidental to involvement in other locations and specific symptoms referable to the small intestine usually were absent. Small intestinal obstruction due to endometriosis is rare. Twenty-seven cases have been collected from the literature. These are summarized in table 1. The first case was reported by de Jong in 1913.

Three additional cases of small intestinal obstruction due to endometriosis have been seen at St. Luke's Hospital in approximately 80,000 surgical pathology specimens and are herewith recorded:

CASE 1. B. G., a 41 year old married woman, was admitted to the hospital in April 1923 with a history of poor appetite and increasing constipation for one year. Menstrual history was not recorded. On examination she was tender in the midline of the lower abdomen. There were no palpable masses. She had a leukocytosis of 14,200 with 84 per cent polymorphonuclears and 16 per cent lymphocytes. Urinalysis was not remarkable. After two days' observation the patient did not improve and a diagnosis of intestinal obstruction was made. At operation a circular, constricting growth was seen in the ileum 6 inches proximal to the ileocecal valve. The intestine was dilated above this lesion. The affected segment was resected and a side to side ileocecostomy performed. The patient died on the first postoperative day, apparently from shock.

The resected specimen measured 12 cm. in length. At one point the lumen was narrowed and the wall was indurated and sharply angulated. The mucosa was grossly normal. Fibrous adhesions were present on the serosa at one point and beneath there was a 3 mm. granulating cavity with extension into the muscular coat. Microscopic examination revealed a group of glands composed of tall columnar cells embedded in the muscular wall of the ileum. The glands resembled those of the endometrium in the resting phase and were surrounded by an endometrial type of stroma which showed some evidence of

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recent hemorrhage. Similar glandular and stromal tissue was seen in the serosa to a lesser extent. The mucosa was normal.

CASE 2. D. R., a 35 year old white female, was admitted to the hospital in August 1948 with a chief complaint of epigastric discomfort of one week's duration. She had vomited two or three times each day. She was uncomfortable and had had a "rolling sensation" in her abdomen several times a day accompanied by a crampy lower abdominal pain which had not been severe. The patient had had no bowel movements without the aid of enemata but had continued to pass gas up to the day of admission when she passed nothing by rectum. Her vomitus had not been fecal in character. She had noticed that her abdomen had grown larger for the last three days before admission. There had been no bloody or tarry stools and no jaundice.

She had had increasing dysmenorrhea for the last several years and the present attack had begun at the onset of a menstrual period. There was no history of operations or pregnancies, although she had used no contraceptives during 12 years of married life.

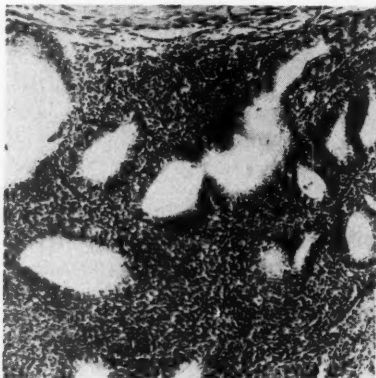


Fig. 1. Low power photomicrograph showing typical endometrial glands and stroma embedded within the muscularis of the ileum, case 2.

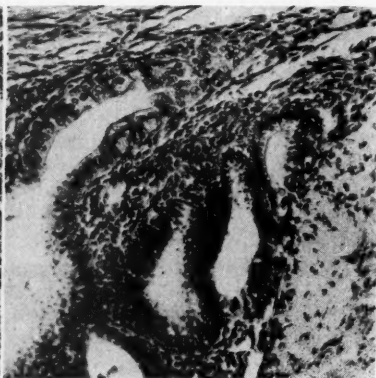


Fig. 2. High power view of case 2.

On admission her temperature was 99.8 F., pulse 120, and she was dehydrated. The abdomen was protuberant and diffusely tender. Visible peristalsis was present. No spasm, masses, or signs of free fluid were noted. There was a 3rd degree retroversion of the uterus but no pelvic masses. Laboratory findings: Hemoglobin 21 Gm., red blood count 6.76 million, white blood count 10,750, polymorphonuclears 66 per cent, lymphocytes 27 per cent, monocytes 7 per cent, blood urea nitrogen 19.8 mg. Urinalysis, serology, and blood sugar were not remarkable. X-ray of the abdomen showed multiple dilated loops of small bowel with fluid levels.

After suitable preparation the patient was operated upon. Six inches proximal to the ileocecal valve there was a dense scarlike area constricting the ileum and no intestinal contents seemed to pass this point. The bowel was dilated above and collapsed below. The pelvic organs were not remarkable. The involved ileum was resected and an end to side ileocecostomy done. Con-



TABLE 1

No.	Author	Age	Prev. Ops.	Par-ity	Symptoms	Duration	Bowel Involved	Other Organs	Operation
1	DeJong	35	---	---	---	6 mos.	term. ileum	---	resection
2	Semb	47	---	0	intermittent RLQ pain	several years	small intest. in wall	---	resection
3	Baltzer	41	---	2	abdominal pain worse at menses	3 years	term. ileum surface	append. uterus umbilic.	resection. end to end anastomosis
4	Adams-Ray	45	---	---	obstructive—worse at menses	3 mos.	ileocecal in wall	pelvic colon; ovary	resection
5	Schär-Scheidegger	48	---	3	obstruct. at menses dysmenorrhea	2 mos. 1 year	term. ileum	---	resection
6	Behrendt Neumeyer	39	---	---	---	---	term. ileum—in wall; superfic. on all small intestines ileum	colon; pelvic periton.	resection
7	Dougal	---	---	---	"intest. obstruct."	chronic	---	ovaries; recto-vag. septum	hysterectomy & oophorectomy; symptoms relieved.
8	Gale	---	---	---	abdom. pain; vomit.	1 day	60 cm. above ileocecal valve; in wall; perforation—fish bone	not described	resection; end to end anastomosis.
9	Goodwin	49	App. Sus.	---	menstrual cramps	10 years	term. ileum superficial	right ovary	bilat. oophorectomy symptoms relieved.
10	Mouat	36	---	0	mild intest. obstr. dysmenorrhea; colicky pains	2 years 1 year	term. 9" ileum	left tube and ovary	resection; end to end anastomosis.
11	Starr	38	---	---	right abdom. pain	several days	term. ileum—in wall	appendix cecum	resection term. ileum, cecum.
12	Gallo-Pozzo	30	---	1	partial intest. obstr. at menses	5 mos.	terminal ileum	---	resection
13	Morrin	46	Salp.	0	subacute obstruct.	6 mos.	9" above ileocecal valve	ovary, tube abdom. scar none	ileo-transverse colostomy.
14	Wood-Deibert	38	App.	0	abdom. pain at menses	2 mos.	term. ileum; on surface—in wall	---	resection

TABLE 1—Continued

No.	Author	Age	Prev. Ops.	Par-ity	Symptoms	Duration	Bowel Involved	Other Organs	Operation
15	Glenn-Thornton	31	—	1	lower abdom. pain at menses	8 mos.	terminal ileum—in wall	pelvis	resection
16	Glenn-Thornton	50	—	—	abdom. pain at menses	2 years	terminal ileum—in wall	—	resection
17	Michon-Olivier	33	—	—	low grade obstruct.	6 mos.	term. ileum—wall	—	resection
18	Michon-Olivier	41	—	—	acute obstruction	1 day	term. ileum—wall	—	ileostomy-resect.
19	Aronsen	43	App.	1	bleeding-umbilicus low grade obstr.	3 years	upper ileum—in wall	umbilicus	resection
20	Poulsen	50	App.	—	low grade obstruct.	2 years	terminal ileum	—	resection
21	Milnor	40	—	—	subacute obstruct.	1½ years	terminal ileum	—	resection
22	Cunningham Smith	37	—	2	colicky abdom. pain at menses	3 years	term. ileum—wall	both ovaries	resection
						several mos.	lead—point in intussusception	—	resection
23	McGuff, et al.	43	—	—	of partial obstr.	2 mos.	terminal ileum	none	resection
24	McGuff, et al.	33	—	0	of partial obstr.	sev. mos.	terminal ileum	?rt. adnexae	resection
25	McGuff, et al.	31	App.	1	colicky RLQ pain at menses	9 years	terminal ileum	?rt. adnexae	resection
26	Grigsby	48	—	1	rt. lower quadrant abdom. pain	12 hrs.	18" of term. ileum; adhesions volvulus	uterus	lysis of adhesions remained well.
27	Grigsby	32	—	—	abdominal pain	2 mos.	terminal ileum	ovary	resection
28	Clark	41	—	—	abdominal pain	1 year	terminal ileum	—	resection
29	Clark	35	0	0	epigastric pain vomiting	1 week	terminal ileum—in wall	—	resection
30	Clark	40	Hyst.	—	right lower quad. abdominal pain vomiting	1 day	terminal ileum—in wall	—	resection

## Abbreviations:

App.—appendectomy.

Hyst.—hysterectomy.

Salp.—salpingectomy.

Sus.—suspension of uterus.

valescence was uneventful and the patient was discharged from the hospital on the fourteenth postoperative day.

Pathological examination revealed a segment of ileum 8 cm. in length. Near one end the lumen was obstructed by a thickening in the muscularis. One area 8 mm. in diameter was very firm and pale. The mucosa was intact and the serosa was adherent to itself at this point, kinking the bowel. Microscopic examination showed typical endometrial glands and stroma buried in the intestinal muscularis. There was much surrounding fibrosis and scarring (figs. 1 and 2).

The patient was last seen six months later and was well.

CASE 3. I. M., a 40 year old white woman, the wife of a physician, was admitted in October 1948 with a 24 hour story of crampy abdominal pain, which localized in the right lower quadrant a few hours after onset. The patient vomited several times and the pain persisted. She had had a supravaginal hysterectomy several years previously and her past history was otherwise irrelevant.

*Physical examination:* Temperature 100 F., pulse 80. The abdomen was slightly distended and showed direct and rebound tenderness in the right lower quadrant. Pelvic examination was noncontributory. White blood count 17,400, polymorphonuclears 86 per cent, lymphocytes 14 per cent.

A diagnosis of acute appendicitis was made and the abdomen was opened through a McBurney incision. A moderate amount of free serosanguineous fluid was present in the peritoneal cavity. At a point 12 cm. above the ileocecal valve the ileum was narrowed and kinked. Proximally, the intestine was moderately dilated. The involved segment was resected and an end to end anastomosis was done. Convalescence was uncomplicated and the patient left the hospital on the eighth postoperative day.

*Pathological examination:* The specimen was a 10 cm. segment of ileum with two sharp kinks held by firm fibrous adhesions. The serosa was smooth. The wall was 2 to 4 mm. in thickness except at the kinked area where it was 1 cm. The mucosa was intact. Microscopic sections showed typical endometrial glands and stroma within the muscular layer of the ileum. There was considerable fibrosis and lymphoid infiltration. The mucosa was unaffected.

## DISCUSSION

In the 30 patients with this condition, including the 3 cases herein reported, the age has varied from 30 to 50 years with an average of 37.9 and a median of 39. The incidence is nearly uniform in each five year period in this age group, as will be seen in table 2. Sterility has been mentioned as a prominent result of pelvic endometriosis. Eight of these patients had been pregnant, 2 of whom had terminated in spontaneous abortions. Six patients are stated as not having been pregnant and the remainder are not specified (table 3). Seven patients had had previous operations of which four were appendectomies and the other three were miscellaneous pelvic operations (table 4).

TABLE 2

	<i>Age</i>					
	30-34	35-39	40-44	45-49	50	Not Stated
Number of Cases	6	8	7	6	2	1
Average	37.9 years.					
Median	39 years.					

TABLE 3

*Previous Pregnancies*

Delivered of term pregnancy	6 Cases
Spontaneous abortions	2
No pregnancies	6
Not stated	16

TABLE 4

*Previous Operations*

Number of cases having had a previous operation	7	
Appendectomy		4
Hysterectomy		1
Salpingectomy		1
Uterine suspension-appendectomy		1
No previous operation	1	
Not stated	22	

The symptomatology is somewhat variable. Many of the patients had had preliminary symptoms consisting of dysmenorrhea of the acquired type in increasing severity for many years. Specific symptoms of intestinal obstruction of varying severity and duration from 12 hours to 2 years or more have been superimposed upon this background. When prolonged, the obstructive symptoms have been intermittent and have been associated generally with menstrual periods. When mild, these symptoms often are confused with menstrual cramps which are present also. Abdominal pain usually is generalized but when localized, is frequently in the right lower quadrant. The same is true of tenderness and when the obstruction is low grade in nature, a common preoperative diagnosis is acute appendicitis.

Physical signs indicated small bowel obstruction but were most frequently nonspecific as to cause. A low grade fever with a moderately elevated pulse generally was present. Depending upon the degree and duration of the obstruction, abdominal distention and borborygmi were present. Visible peristalsis was seen occasionally. Pelvic examination usually was not helpful. A moderate leukocytosis with an elevation of the polymorphonuclear percentage frequently was present. Scout films of the abdomen may show dilated small intestinal loops as in case 2.

The site of the obstruction was almost invariably in the distal ileum. The one possible exception in the collected cases is that of Semb, which was specified as "small intestine." Gale's case was 60 cm. above the ileocecal valve. The remainder were in the terminal few centimeters of the ileum.

The endometrial implant may be either superficially located on the serosa or deeper in the muscular wall of the intestine.<sup>3</sup> The superficial implants usually do not produce obstruction of the lumen. In most of the collected cases the implants were described as being within the muscular coat of the intestine. In only 2 cases (Baltzer's and Goodwin's) were the lesions described as being only in the serosal layer and in Goodwin's case the symptoms were relieved completely by oophorectomy without direct attack upon the bowel. In no case is the lesion described as extending through the mucosa (table 5).

TABLE 5

*Layer of Bowel Wall Involved by Endometriosis*

Muscularis (in wall)	12
Serosa	2
Muscularis and serosa	1
Not stated	14

Obstruction is not due to the bulk of the endometrial glands, which usually is small, but to the associated hemorrhage, fibrosis and adhesions. Microscopically, fibrosis is a prominent feature of the lesion.

Three of the cases revealed interesting complications. Gale's case presented as a perforation of the ileum caused by a fish bone just above a stenotic area due to endometriosis. In Cunningham and Smith's case a nodule of endometriosis in the bowel acted as the lead point in an intussusception. Both of these cases required resection of a segment of ileum. In Grigsby's first case the obstruction

TABLE 6

*Extra-Intestinal Involvement*

Ovary	8	Appendix	2
Oviduct	4	Umbilicus	2
Pelvic colon	3	Abdominal scar	1
Uterus	2	Other	3
Not stated	13		

N.b. Several cases had multiple involvement.

was actually due to adhesions and volvulus of a segment of ileum involved with endometriosis and was relieved by lysis of adhesions.

It is remarkable that in only 16 of the cases were organs other than ileum described as involved (table 6). It is likely that additional involvement was present in other cases and not described in the operative notes. Some of the operations were done through a McBurney incision, making exploration difficult. Frequently the etiology of the obstruction was not realized until microscopic examination of the resected tissue was done.

TABLE 7

*Operative Procedure Employed*

Resection of ileum with end to end anastomosis	6
Resection of ileum with end to side anastomosis	1
Resection of ileum with side to side anastomosis	1
Resection of ileocecal region—side to side anastomosis	3
Resection of ileocecal region—end to end anastomosis	2
Resection of ileocecal region—end to side anastomosis	1
Resection of ileocecal region—anastomosis not stated	5
Resection—details not stated	7
Ileotransverse colostomy	1
Hysterectomy—oophorectomy	1
Bilateral oophorectomy	1
Lysis of adhesions—release of volvulus	1

Resection of the affected segment with some form of anastomosis was employed in 26 of the 30 cases (table 7). In 1 additional case (Morris's) the obstructed point was short circuited by an ileotransverse colostomy without resection. In case 7 (table 1) a hysterectomy and oophorectomy were done and in case 9 a bilateral oophorectomy performed both without direct attack upon the bowel. In each case the obstructive symptoms were relieved. In case 26 adhesions were divided and a volvulus untwisted with relief of symptoms.

## CONCLUSIONS

Endometriosis is a well-established although uncommon cause of small intestinal obstruction and must be considered in the differential diagnosis of that condition. The diagnosis rarely can be established preoperatively, but a history of dysmenorrhea of the acquired type and obstructive symptoms associated with menstrual periods are highly suggestive. Physical findings on pelvic examination compatible with pelvic endometriosis are confirmatory. Such symptoms associated with endometriosis in an abdominal scar or in the umbilicus, as in cases 17 and 19 are almost diagnostic. At operation the presence of an obstructive lesion of the terminal ileum, characterized by reddish brown or blue nodules in the bowel wall, and fibrous adhesions in this region unassociated with inflammatory changes in the mesentery, is highly suggestive. The presence of



"chocolate cysts" of the ovary or other signs of endometriosis in the adnexa, pouch of Douglas or other pelvic areas is confirmatory.

Treatment is surgical. The operation of choice is resection of the involved segment with an end to end anastomosis. A short circuiting anastomosis without resection also will relieve symptoms at least temporarily but is not the ideal procedure because residual endometriosis and blind pouches of intestine remain. After relieving the obstruction, oophorectomy, in addition, may be considered in relation to the age of the patient, her desire for children, and the extent of unremoved disease, if any. Bilateral oophorectomy alone relieved the 2 cases of chronic low grade obstruction in which it was tried. For extensive lesions it is not reliable, however, for it cannot relieve the associated fibrosis and will leave a stenotic segment of intestine. Theoretically, low grade, incomplete obstruction due to endometriosis might be relieved by irradiation sterilization. In practice this is not feasible for four reasons:

1. The diagnosis cannot be established with certainty before operation.
2. A low grade obstruction might be converted into a complete obstruction by the early x-ray reaction.
3. Always present in the lesion is a large component of fibrosis which irradiation could not relieve and might augment.
4. Sterility would, of necessity, result.

#### SUMMARY

1. Twenty-seven cases of small intestinal obstruction due to endometriosis are collected from the literature.
2. Three additional cases are added.
3. This condition is discussed briefly from the viewpoints of diagnosis and treatment.

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## RECENT STUDIES ON OBESITY

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**T**HE progressive conquest of infectious diseases has thrown into bold relief our relative failure to cope with the host of metabolic and degenerative disorders which plague mankind. Despite the current popularity of ACTH and cortisone, we are little closer to real understanding of the nature of the conditions which they sometimes alleviate, since these materials are actually used as pharmacologic rather than physiologic agents. The real hope for continued progress toward a longer and a healthier life lies in a better understanding of the basic causes of the degenerative diseases and of the factors which initiate or accentuate them. Among these latter, the importance of obesity as a deterrent to health and longevity has not been sufficiently emphasized.

The logic of including obesity among the basic medical problems may be questioned by some. It is never mentioned in the popular lists of the leading causes of death and, purely in its own right, probably never kills a patient. Nevertheless, while never a murderer, it is often an accessory, and hence guilty under the law. Without indulging in speculation concerning the role of obesity in the etiology of such conditions as hypertension and diabetes, it is sufficient to point out the very striking correlation between obesity and mortality rate in persons of middle age and beyond. Thus, in the age group 45 to 50 years, the death rate increases roughly 10 per cent for each 10 pounds of excess weight. It is estimated that a man who is 50 pounds overweight has his life expectancy decreased as greatly as does a man with valvular heart disease.

The high incidence of obesity is only now beginning to be appreciated. It is the commonest abnormality in persons over 40 years of age, afflicting 35 per cent of all males and 50 to 60 per cent of all females.

The purely physiologic cost of obesity is of interest because of its bearing on the fitness of men for certain tasks in industry and in the armed services. Studies in several laboratories, including our own, indicate a significant influence of obesity in reducing the tolerance for exercise and thermal stresses. Studies on other types of stress are now in progress.

Limitation of time precludes an exhaustive analysis of the basic

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Presented during the Hollywood Assembly of The Southeastern Surgical Congress, Hollywood, Fla., April 11-14, 1951.

problems of the causes and treatment of obesity. The remainder of this paper will be confined to a brief discussion of several topics on which important fundamental knowledge has been gained in recent years.

*Modern views on the nature of adipose tissue and the mechanisms of deposition and mobilization of fat.* Virchow, many years ago, taught that adipose tissue is merely connective tissue which has passively stored fat, and because of his great influence this view has persisted in spite of overwhelming evidence to the contrary. This concept involves the assumption that any and all connective tissue may store fat when it accumulates in excess, and is not consistent with the common observation that fat does not become generally and diffusely deposited in the connective tissues of the body, even in obesity. The work of many investigators since Virchow's time (reviewed by Wells<sup>1</sup> and Wertheimer and Shapiro<sup>2</sup> has forced the abandonment of this belief in favor of the concept that adipose tissue is a distinct tissue, closely related to lymphoid and reticulo-endothelial tissues and derived from a primitive mesenchymal stem cell, the lipoblast. The distribution of these specialized adipose cells determines the distribution of fat in obesity.

Another idea which is gaining support is that the deposition of fat in adipose cells is an active process, depending upon a definite cellular enzyme system which is inhibited by cyanide and fluoride.<sup>2</sup> It seems probable that a different enzyme system is necessary for mobilization of stored fat in adipose cells, and that deficiency of this enzyme may account for failure of mobilization of fat from certain types of lipomas and liposarcomas even during general body emaciation. The role of these enzymes in determining the degree and distribution of obesity provides an interesting topic for speculation, but no experimental data are available.

Still another new field of study has been opened up by the finding<sup>3-6</sup> that adipose tissue is supplied by sympathetic nerve fibers which apparently play an important role in deposition and mobilization of fat. This may provide the link connecting adipose tissue and the hypothalamus and help to explain the obesity produced by hypothalamic lesions. It also hints at a basis for the well-known relation between emotional life and obesity.

Fat stored in adipose tissue is no longer regarded as inert. Studies with radioisotopes have indicated a constant turnover of fat between liver, adipose tissue and other cells of the body. These studies<sup>7-11</sup> indicate furthermore that the synthesis of fatty acids and the conversion of carbohydrate to fat may occur in the fat cells as well as in the liver.

Studies of the type mentioned above must surely increase our respect for the complexity of the processes underlying the genesis of obesity, and it is not too much to hope that they may also, in time, lead to a better understanding of the nature and causes of obesity itself.

*Theories of the etiology of obesity.* In times past an aura of mystery surrounded the fact that certain people become obese while others do not. More economical utilization of food, lowered basal metabolism, endocrine abnormalities and hereditary factors of unknown nature were invoked. Thanks largely to the exhaustive studies of Newburgh<sup>12</sup> and of Evans<sup>13</sup> it is now generally accepted that obesity results only from overeating and that the second law of thermodynamics is not violated.

The basic problem of etiology is thus simplified but by no means solved. It is resolved into an inquiry into the cause of the overeating and the even more basic problem of the nature and regulation of hunger and appetite. Unfortunately, the physiologist has not yet been able to furnish the clinician with the answers. The nature of the stimulus which leads to eating and the factor which determines the end point of food ingestion are equally obscure. Certain observations, however, are worthy of mention. In the first place, hunger and appetite must be regarded as separate entities, hunger being an instinctive behavior reaction in response to contractions of the empty stomach, while appetite is a learned response induced by the sight, smell or thought of food. It is believed that the hunger mechanism is of vanishing importance in the adult, though very important in the infant. It follows that the timing of food intake is largely a matter of appetite ordinarily molded by custom into three meals a day. The adjustment of food intake to caloric needs determines whether the individual will maintain normal weight or become thin or obese. The average person, with unlimited food available, eats until a point of satiety is reached. If the satiety point is reached early, the subject tends to be thin, while if it is delayed beyond normal limits a gain in weight results. It should be noted that in each case, the subject believes that he has eaten the necessary amount of food to satisfy his nutritional needs. This is no doubt the basis of the belief that some people remain thin on an adequate food intake while others gain weight even though they may stop short of complete satiety.

It is apparent that the factor which terminates food intake, rather than the stimulus which leads to eating, is the one of basic importance in the etiology of obesity. Sensory impulses from the stomach and intestines are of doubtful importance. Vagotomy and exten-

sive gastrointestinal resection do not seriously disturb adjustment of food intake to caloric requirements, and Sherrington<sup>14</sup> reported maintenance of normal weight in a dog with both vagus nerves cut and the spinal cord sectioned at the level of C-8. Harris, Ivy and Searle<sup>15</sup> have furthermore reported that weight loss in dogs due to administration of amphetamine is unaffected by sensory denervation of stomach and intestines. Chemical changes in the blood resulting from food intake have been suggested as constituting the stimulus for cessation of eating, but without adequate experimental support.

Recently, it has been reported<sup>13</sup> that food intake is associated with a rise in skin temperature, presumably reflecting a rise in total heat production. A feeling of satiety occurs when the skin temperature reaches a certain level and this reaction is delayed in obese subjects. The significance of this phenomenon is not clear, but it suggests a possible hypothalamic regulation of appetite which is in keeping with the hyperphagia resulting from experimental lesions in the hypothalamus. Investigations of this type are in their infancy, but they offer hope of eventual solution of the basic cause of obesity.

*Quantitative measurement of obesity.* In most clinical cases, the diagnosis of obesity is obvious. However, at times, obesity and fluid retention may be confused and in research a quantitative expression of the degree of obesity is necessary. Hence there has been a constant search for better methods of measuring the fat content of the body. One of the earliest of these methods was the determination of the creatinine coefficient (mg. creatinine excreted per kg. body weight per 24 hours).<sup>16</sup> Creatinine excretion is proportional to total muscle mass of the body and hence the coefficient is decreased in proportion to the increase in nonmuscle tissue, e.g. adipose tissue. This method is simple, but has never been evaluated against more exact technics.

Behnke<sup>17</sup> introduced the technic of estimating fat content from body specific gravity, based on the low specific gravity of fat. The higher the fat content of the body the lower is its specific gravity. Body specific gravity is calculated from the ratio of body weight in air and under water. This method has been validated in animals by comparison with fat content determined by chemical analysis.<sup>18</sup> The latest method for measurement of fat content is based on the observation that the water content of the fat-free body mass is remarkably constant. Fat may be considered to dilute the body water (since adipose tissue has a low water content). Hence total body water percentage is lowered in proportion to the amount of fat present and may be used to estimate body fat. Body water content is calculated from the dilution of a substance which, on intra-



venous injection, is evenly distributed throughout the total body water. Deuterium oxide<sup>19</sup> and antipyrine<sup>20</sup> are most widely used for this purpose, and the results agree well with those obtained by the body specific gravity method.

Both the body specific gravity and body water methods give reasonably accurate estimates of the fat content of the body, but the former is inapplicable to hospital patients and the latter requires expensive apparatus. The search continues for a method which is simple, accurate and inexpensive.

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## ABDOMINAL TUMORS—A UROLOGIC PERSPECTIVE

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THE purpose of this paper is to present a urologic perspective of abdominal masses, and make known some of the diagnostic methods that urology has to offer. Accuracy of diagnosis may be enhanced by determining the relationship of the tumor mass to adjoining viscera. It is well known that certain viscera such as the stomach and intestines are relatively mobile, while others are relatively immobile, namely the liver, spleen, kidneys and pancreas.

Dr. Samuel Brown<sup>1</sup> in a roentgenologic essay, expressed the dictum that according to the unaltering law of nature, two bodies cannot occupy the same place at the same time, and the enlargement of an organ or the presence of a new mass within the abdominal cavity will bring about the displacement, compression, or both, of an adjoining structure. There is a normal constant relationship between the kidneys and the other abdominal viscera that is familiar to all students of anatomy. The right kidney is adjacent to the liver, the suprarenal gland, the colon and duodenum. The left kidney topography involves the suprarenal, the stomach, spleen, pancreas, jejunum and colon. The ureters and bladder also have a fixed relationship to the pelvic viscera.

Roentgenologic studies of the urinary tract had their inception in 1902,<sup>2</sup> and since that time have aided materially in obtaining accurate diagnosis of the abdominal masses, both intrinsic and extrinsic to this system. As late as 1922, intravenous sodium iodide was shown to faintly outline the urinary tract and since that time our greatest advances in urography have been accomplished. Binz and von Lichtenberg introduced, about 1930, the organic iodides that are widely used today. Much of the research was done by Swick.

Although the kidneys are not entirely immobile, there are departures from the normal mobility that are diagnostic of pathology, either in the kidneys or in neighboring viscera. Figure 1 shows the normal position of the kidneys in the anteroposterior and figure 2 in the lateral position. Three dimensional study is imperative for this type of investigation.

Figure 3 shows displacement of the kidney inferiorly, caused by

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Presented during the Hollywood Assembly of The Southeastern Surgical Congress, Hollywood, Fla., April 11-14, 1951.



Fig. 1. Normal anteroposterior pyelogram.



Fig. 2. Normal pyelogram lateral view.

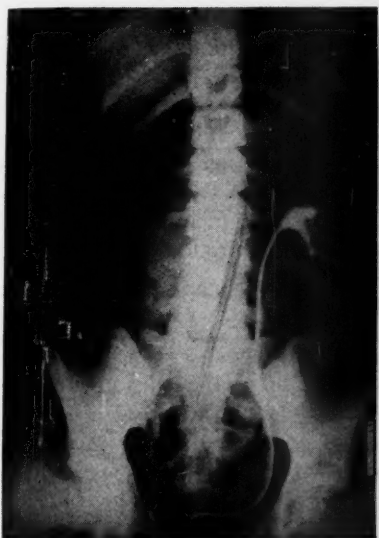


Fig. 3. Adrenal cyst above left kidney.



Fig. 4. Left kidney displaced across spine by large spleen.

a large adrenal cyst which was first considered by us to be an enlarged syphilitic spleen, because of positive serology and regression



Fig. 5. Tubercular abscess displacing right kidney upward.



Fig. 6. Ectopic left kidney.

of the tumor upon instituting anti-syphilitic therapy. This tumor was proven at operation in 1940 to be an adrenal cyst. Had aerography been used, the mass would have been established as a retroperitoneal one before surgery was instituted. Aerography, or perirenal insufflation by injecting air into the perirenal space, was introduced by Corelli in 1921, advised by Cahill 15 years later, and impressively implanted in our armamentarium by Senger and Bottone<sup>3</sup> in 1944. It aids materially in delineating the adrenals.

Although the spleen is an intraperitoneal organ and the kidney a retroperitoneal one, enlargement of the spleen has been known to displace the kidney entirely across the midline, as shown (fig. 4). This patient had myelogenous leukemia and as the spleen regressed to its normal size and position under x-ray therapy, the kidney returned to its normal position. Two similar cases have been shown in the "Leon Howard Hour" (Dr. Leon Howard, Denver, Colo.) at sectional urologic meetings.

The authors were prompted, in writing this paper, by their knowledge of surgical errors that could have been prevented by proper preoperative urologic examination, such as the following instances:

1. In which a kidney tumor was encountered at operation for splenectomy.

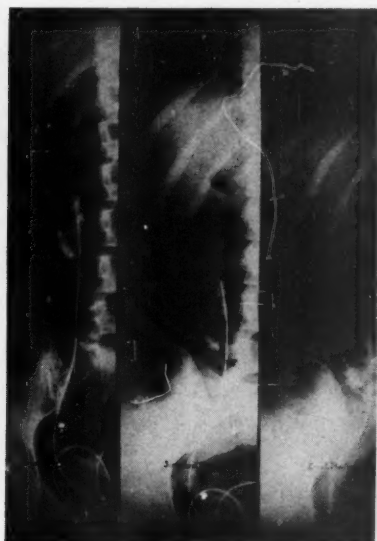


Fig. 7. Nephroptosis: Right, supine, semi-erect and upright.

2. In which ectopic kidney was encountered in operation for ovarian cyst.

3. In which appendectomy was done to relieve pain of nephroptosis.

4. In which adrenal cyst was mistaken for syphilitic spleen.

These errors could easily have been prevented by obtaining a survey of the urologic tract preoperatively, and in the latter case by perirenal insufflation which, in the light of our present knowledge, was clearly indicated.

Figure 5 shows a large tubercular cold abscess displacing the right kidney.

Figure 6 shows an ectopic left kidney. This condition has been mistaken for tubo-ovarian pathology. Congenital anomalies of the urinary tract per se are common, and ectopic kidneys are frequently demonstrated to occupy space within the bony pelvis. The ptosed kidney falls within a similar category as demonstrated (fig. 7). Unlike the ectopic kidney, the ptosed kidney is very mobile and may rest in its normal position in the supine posture, but in an abnormally low position when the patient is erect. This patient had an appendectomy, pelvic exploratory and operation for adhesions.

Other congenital anomalies are common, such as duplication of



Fig. 8(a) Sympathetic neuroblastoma below left kidney in child.



Fig. 8(b) Sympathetic neuroblastoma lateral view. Same case as 8(a).



Fig. 9. Pyelectasis with kidney overlying the cecum.



Fig. 10. Solitary cyst kidney. Note saddle type pelvis.

the urinary tract and horseshoe kidney. Figure 8 shows displacement of the left ureter in a child caused by a sympathetic neuroblastoma below the kidney.



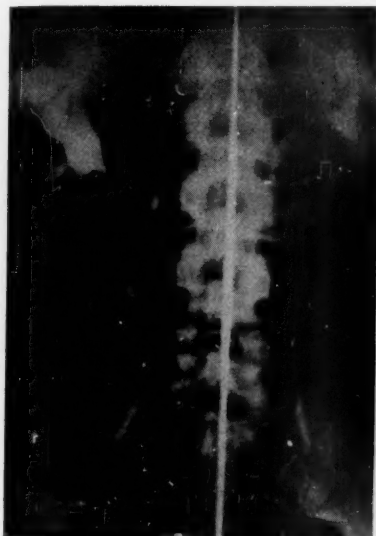


Fig. 11. Polycystic disease.



Fig. 12. Displaced ureter caused by metastasis from testicular tumor.

Figure 9 shows a hydronephrosis and kinked ureter with a mass lying over the cecum. This patient was operated upon for tumor of the cecum because of a pressure deformity demonstrated there by barium enema.

A solitary cyst of the kidney is presented (fig. 10), showing the typical saddle type kidney pelvis riding the cyst. It is impossible to definitely distinguish between solid and cystic tumor of the kidney in most instances by the pyelographic deformity. A relatively new procedure of injecting iodides directly into the aorta and taking x-ray exposures immediately promises to add to the differential diagnosis of solid and cystic tumors. The blood supply to the cyst and that to the solid tumor is the criterion of difference.

Polycystic disease is demonstrated (fig. 11). Notice the bilateral enlargement of the kidneys.

Figure 12 demonstrates the typical deformity of the ureter produced by metastasis of a testicular tumor. The lesion in the testicle was hardly discernible upon palpation. Invaded lymph nodes along the aortic chain displace the adjacent ureter. Retroperitoneal fibromas and sarcomas frequently cause a similar displacement of the ureter which is often better observed in the lateral view (fig. 13). This anterior displacement was caused by an abnormal accumulation of fat in the perirenal and periureteric regions. This condition



Fig. 13. Retroperitoneal lipoma. Lateral view.



Fig. 14(a) Pyelectasis (hydronephrosis) right side, four year old child.



Fig. 14(b) Same case as 14(a) showing bladder superimposed.

has been referred to as a "diffuse lipoma," but there is controversy as to the existence of such a pathologic entity. Incidentally, this is not a retrocaval ureter as the anteroposterior view suggests.

Although this paper was not intended to be an all inclusive treatise on abdominal tumors, we would be amiss not to mention the most common of all abdominal tumors—the distended bladder. This condition is easily confused with pelvic or abdominal pathology and it must be remembered that the bladder extends high into the abdomen in children.

Pyelectasis (hydronephrosis) is shown (fig. 14a, 14b). This is a massive tumor with a capacity of over two liters in a child. Note the position of the bladder as is seen in the superimposed cystogram.

Pelvic pathology such as fibroids, ovarian tumors and bone tumors arising from inside the bony pelvis may encroach upon the lower ureters or bladder, causing urinary complaints and even displacement of these structures demonstrable by x-ray. Endometriosis will sometimes invade the urinary tract and produce deformity. Kidney tumors were not included in this presentation but many are palpable and require pyelograms for diagnosis.

One must not lose sight of the fact that other organs might also be encroached upon and show x-ray deformity, such as a case of pancreatic cyst<sup>4</sup> which displaced the ureter, caused deformity of the stomach and encroached upon the splenic flexure of the colon.

In summary, several conditions causing abdominal masses have been presented. Displacement of various parts of the urinary tract has been demonstrated by intrinsic and extrinsic pathologic conditions.

In conclusion, it is shown here that much valuable information may be gained by a three dimensional urologic survey whenever an abdominal mass is encountered at physical examination.

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## CLINICAL BEHAVIOR OF JEJUNAL DIVERTICULA

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**A**LTHOUGH diverticula of the jejunum are considered as the rarest of the out-pouchings of the gastrointestinal tract with the exception of a false diverticulum of the ileum, our attention was directed toward this condition by 3 patients presenting themselves within a short period of time with symptoms referable to the presence of this abnormality. Unquestionably the majority of these lesions produce no symptoms, and the diverticulum is found incidentally at autopsy, operation or roentgenological examination. In most of the cases operated upon because of an acute condition within the abdomen or chronic intestinal obstruction, the diagnosis has not been anticipated. This paper is principally concerned with the symptomatology produced by jejunal diverticula, and the data have been obtained by a review of the literature and a study of the 3 cases herein named.

In decreasing order the relative incidence of diverticula is: colon, Meckel's diverticulum, duodenum, pharynx, esophagus, stomach, and jejunum. The rarest is the false diverticulum of the ileum. Diverticula are most prone to occur in weak points in the intestinal wall, and it is for this reason that most of them occur in the mesenteric border of the bowel at the points of entrance of the mesenteric vessels. Occasionally, however, they are found on the anti-mesenteric border, and in the literature 7 such cases were reported. One of our cases was so situated. They are more often found in the first part of the jejunum and usually have large ostia. Many such diverticula produce no symptoms probably because of these large openings. It is not at all uncommon to find associated diverticula in other parts of the gastrointestinal tract. There have been recorded 49 cases with associated diverticula in the duodenum, 45 in the colon, 10 in the ileum, 7 in the esophagus, 3 in the stomach, 14 in the bladder, and 1 in the urethra. They are slightly more common in males, there being 97 males and 77 females reported in one review.

When jejunal diverticula produce symptoms they are due to the presence of one or more complications, and these have been carefully presented by Benson, who lists acute or chronic intestinal obstruction as the principal one. This may be produced by pressure

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of the filled diverticulum upon the intestines, volvulus of the bowel, stricture or adhesions from previous diverticulitis, by pressure of an inflammatory mass associated with diverticulitis, or from enteroliths formed within the diverticulum. Since the symptoms of a chronic intestinal obstruction are usually associated with a filling of the sac, the patient usually notices the distress an hour or more after taking food. The symptoms may be produced by inflammatory changes in or about the diverticulum, and may vary from a mild catarrhal inflammation to gangrene resulting in perforation and peritonitis. Hemorrhage may occur or rupture of the sac with onset of signs of peritonitis. Such a perforation can occur spontaneously or as the result of trauma. Foreign bodies, such as bones, parasites, and enteroliths may lodge in the diverticulum, or it may be involved with neoplastic disease and formation of heterotopic tissue. This latter involvement may be benign, as in fibroma, lipoma, or accessory pancreatic tissue or it may be malignant. Benson has reported a case of a small cell adenocarcinoma situated in a large jejunal diverticulum.

The symptoms produced by diverticula of the jejunum are varied, but a review of 177 cases reported in the literature reveals certain symptoms which are frequently found in this condition. Of these cases, 18 had no symptoms referable to the gastrointestinal tract, 26 had typical ulcer-type histories, and 4 complained of symptoms characteristic of gallbladder disease. Ritvo and Votta, in their series of 25 cases, speak of the symptoms as being mild, chronic abdominal pain or soreness accompanied by a feeling of gas on the stomach or severe epigastric distress with nausea and vomiting of an intermittent nature and with a tendency toward remissions and exacerbations. There is usually very little relationship of the symptoms to meals, bowel movements or exertion. They usually coincide with fullness of the sac. In their series, 3 had no gastrointestinal symptoms and the duration in the remaining 22 cases varied from 2 weeks to 15 years. Ten of these cases noticed nausea and vomiting, and 50 per cent complained of anorexia. Edwards has described the mild, indefinite abdominal discomfort without definite localization as flatulent dyspepsia. When localization of the pain is noticed, it is usually in the left upper quadrant of the abdomen. This serves somewhat to differentiate it from the duodenal diverticula, which are more prone to produce right upper quadrant distress. This condition apparently produces no significant change in the bowel habits. An associated constipation has been listed in some instances, and in 6 cases diarrhea was noted. Loss of weight was indicated in only 14 reported cases.

Three patients with this abnormality presented themselves at the

Wheeling Clinic within a relatively short time of each other, and their complaints and roentgenological findings are of considerable interest. Two of the 3 were operated upon with relief of symptoms following resection of the diverticula.

CASE 1. H. C., a 61 year old white male, entered on May 26, 1947, with the complaints of weakness, fatigue, anorexia, and morning emesis of six weeks' duration. F had further noticed some abdominal distress which he characterized as a soreness and heavy feeling in the mid-epigastrium. Constipation had been present for only the past two days. There had been a 12 pound weight loss over a period of three weeks. Physical examination revealed a fatigued and ill patient with no significant abdominal findings. No areas of tenderness could be made out. Gastrointestinal x-rays showed evidence of a partial obstruction at the upper jejunum with a fluid level and retention of barium in the six hour film (fig. 1). On the 24 hour examination, however, a gas-filled loop of upper jejunum was still visible. Upon the basis of these findings surgical exploration was advised and carried out at the Ohio Valley General Hospital on June 20, 1947, at which time a diverticulum the size of a large plum was found situated upon the mesenteric border of the upper jejunum. This was removed by a simple excision and a two layer transverse closure of the bowel. He was discharged from the hospital on his eighth postoperative day; subsequent communications have revealed him symptom-free and his weight has been regained.

CASE 2. J. P. R., a white male, 42 years of age, was first seen at the Wheeling Clinic on Oct. 27, 1947, with a chief complaint of pain, nausea, anorexia, and intermittent pain of severe type occurring in the left upper quadrant of the abdomen and being referred to the left anterior chest. These symptoms were of only two months' duration. Any food by mouth since then produced the knifelike pain with nausea but no emesis. There was associated flatulence and eructations and gurgling in the stomach. He had lost 24 pounds in weight. He had always been somewhat constipated and there had been no changes in his bowel habits. Physical examination showed him to appear older than his stated age, introspective, depressed, and dehydrated. There was maceration of the angles of the mouth and the tongue was red, dry, and smooth. The abdomen was scaphoid and thin walled. There was no visible peristalsis, no masses were palpable, and there was no unusual tenderness. The most significant findings were found in the gastrointestinal x-rays, which revealed a partial obstruction of the upper jejunum, dilatation of the bowel, and a fluid level (fig. 2). The 24 hour examination still showed a large air bubble in the upper small bowel but the barium had passed on. Operation was performed at the Ohio Valley General Hospital on Nov. 4, 1947, and a diverticulum the size of a golf ball was found in the jejunum 12 inches from the ligament of Treitz. This was situated upon the antimesenteric border. This diverticulum was removed in the same manner as in the first case and the postoperative course was complicated only by a urinary infection. Within a month after returning home he gained seven pounds in weight and two and a half years later he had gained 29 pounds, and has remained free of his previous symptoms. The pathological report of the removed tissue revealed evidence of early, acute inflammation as shown by the presence of polymorphonuclear cells infiltrating the mucosa.

CASE 3. A. S., a white female, 46 years of age, complained of burning and



pain in the epigastrium after eating. Fat foods seemed to distress her and she had nausea and vomiting upon occasions. Upon physical examination there was tenderness in the gallbladder area and also across the epigastrium, but no

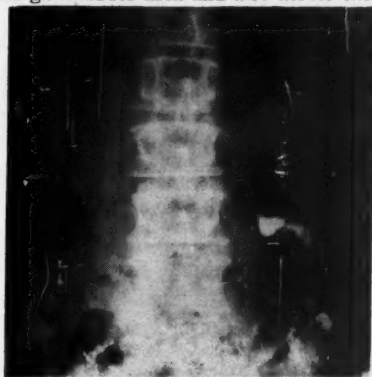


Fig. 1. H. C., age 61. Showing retention of barium and gas in distended jejunum, interpreted as partial obstruction of upper jejunum.



Fig. 2. J. P. R., age 42. Showing dilated loop of jejunum with fluid level and some gastric retention after two hours.



Fig. 3. A. S., age 46. Diverticulum is seen just distal to ligament of Treitz. Gallstones were also demonstrated.

palpable masses or spasm. Gallbladder x-rays revealed calculi in the gallbladder. Gastrointestinal x-rays showed a barium-filled diverticulum in the jejunum just distal to the duodenojejunal junction (fig. 3). Dietary treatment had resulted in very little improvement, but the patient has so far refused surgery.

The first 2 cases well illustrate the possibility of a partial obstruction of the jejunum which may be produced by the presence of a

diverticulum. Severe nausea was found in both instances but emesis in only one. Weight loss was quite pronounced in both and anorexia was an outstanding symptom. Flatulent dyspepsia was present in all 3, but in the third case all of her symptoms could easily be explained on the basis of the cholelithiasis. The roentgenological findings gave the most important clinical information, but in 2 of the 3 cases a diagnosis of jejunal diverticulum could not be made from the x-ray plates. However, the holdup of barium and dilatation of the proximal bowel were of great significance.

If the diagnosis can be made before operation, a trial of conservative treatment, consisting essentially of a bland diet and avoiding roughage would seem advisable. Some have advised postural changes in an effort to empty the sac and have reported some degrees of success. When distressing symptoms persist or when complications arise, surgical resection of the diverticulum is indicated. Some have treated these by invagination of the sac, but the possibility of producing an intestinal obstruction by this method would appear to condemn it. Most of the recorded cases of enteroenterostomy as a sidetracking procedure have eventually come to resection.

At times it may be difficult to demonstrate a diverticulum at operation, particularly if the patient has a fat, thickened mesentery. Mahorner and Kisner have shown that dilatation of the small bowel by means of air injected through a small gauge needle will frequently demonstrate the sac in these cases. Rosedale found an increased incidence of diverticulosis when this procedure was instituted as a routine in autopsy examinations.

Since, in many instances, this condition is found coincidentally at the time of laparotomy the question arises as to whether it should be removed. In view of the future possibilities of obstruction, inflammation, perforation, or the later appearance of symptoms from such a diverticulum, we feel that surgical excision in such a case should be done if the general condition of the patient is satisfactory. In most cases the acute complications arising from this condition have not been preceded by any symptoms.

#### CONCLUSIONS

1. A review of the literature has been made and 3 clinical cases are presented to describe the symptomatology and clinical findings in jejunal diverticula.
2. This condition should be suspected if the patient complains of anorexia, nausea with or without emesis, loss of weight, and left upper quadrant distress with little or no change in the bowel habits.
3. Two of the cases presented illustrate the degree of partial

obstruction which may be produced by the distended sac as demonstrated by the gastrointestinal x-rays. In both these cases a tumor of the jejunum was suspected before operation.

4. Surgical resection of these lesions is easily performed and the relief of symptoms is complete.

5. Clinical symptoms are produced by diverticula of the jejunum usually when some complication arises, such as obstruction, inflammation, hemorrhage, perforation, or the retention of foreign bodies.

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# THE AMERICAN SURGEON

Official Publication of  
THE SOUTHEASTERN SURGICAL CONGRESS  
THE SOUTHWESTERN SURGICAL CONGRESS

*Published Monthly by*  
The AMERICAN SURGEON PUBLISHING COMPANY  
701 Hurt Building, ATLANTA 3

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Subscription in the United States, \$8.00

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Volume XVII

December, 1951

Number 12

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## THE ORTHOPEDIC SURGEON AND POLIOMYELITIS

In the earliest phases of paralytic poliomyelitis, the preservation of life and the relief of pain are the pressing problems. Soon the prevention of deformity must be given attention. If musculoskeletal residuals are significant, this remains of importance for the rest of the patient's life. In the early months following the disease, plotting of existing neuromuscular units, search for newly returned units, serial quantitative measurement of muscle power by muscle examinations, and avoidance of substitution patterns are basic. Statistical studies by Lenhardt demonstrated that, for practical purposes, by the end of 18 months no return of power to new muscle groups could be anticipated.

Orthopedic treatment of poliomyelitis includes not only operative treatment but also treatment by plaster, traction and braces, prescription of therapeutic exercises, and other forms of physical therapy. To do this effectively, the orthopedic surgeon must maintain his interest in the early stages of poliomyelitis and must follow the patient closely in all phases of the illness.

Noteworthy technical improvements have appeared in operative

orthopedics in recent years. These include: the contributions of Bunnell in the field of anchoring tendon to tendon and tendon to bone, the use of stapling in growth control, the extended use of inert metals and other foreign substances as prosthetic replacements for parts of the skeletal system, intramedullary pins, and slotted plates for internal fixation.

A basic discovery upon which improved fixation devices depend is that of the importance of compression in bone healing. Based on this principle also are improved methods of arthrodesis.

Most of the recent developments in medicine and surgery at large have, of course, extended their benefits to the field of orthopedic surgery. The orthopedic surgeon must not be blinded by the glare of these advances, so many of which are purely technical. He must maintain and broaden his interest in the field of musculoskeletal physiology which forms the basis of his specialty. Nowhere is the application of the principles learned from such study more richly rewarding than in the treatment of poliomyelitis. For the orthopedist to allow his interest to wane in the nonoperative and physiotherapeutic aspects of poliomyelitis is to invite the charge of "technician." For him to permit his knowledge of musculoskeletal physiology to lie fallow is to confirm this charge. Such a surgeon is not only crippling his own offensive strength in the all-out battle, but, worse yet, he is also running the risk of bringing up his protégés in the image of the technician which he has thus become.

Only by maintaining his interest in the traditional "strap and buckle" phases of his specialty and in all the nonoperative as well as the operative aspects of poliomyelitis can the orthopedic surgeon make his greatest contribution to reaching the goal for the individual polio patient and for polio patients as a group. In terms of musculoskeletal physiology this goal is optimum development, and utilization of all remaining innervated musculature.

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## BOOK REVIEWS

*The Editors of THE AMERICAN SURGEON will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The editors do not, however, agree to review all books that have been submitted without solicitation.*

**CLINICAL HEART DISEASE.** By SAMUEL A. LEVINE, M.D., F.A.C.P., Clinical Professor of Medicine, Harvard Medical School; Physician, Peter Bent Brigham Hospital, Boston; Consultant Cardiologist, Newton-Wellesley Hospital; Physician, N. E. Baptist Hospital (ed. 4). Philadelphia and London, W. B. Saunders Co., 1951. 556 pages. 192 figures. \$7.75.

Those who have read the previous editions will be glad to know that in the fourth edition the author has retained, almost intact, the material in the section on clinical heart disease of the previous editions. A few sections have been rewritten. Additional material on new methods and new treatments has been added in all sections where it was needed. The entire volume still has what most people consider one of its greatest assets—the conversational style of presentation, which makes it so readable and understandable.

The section on electrocardiography is well presented from a physiological basis and contains discussions of the unipolar as well as the precordial and standard leads. The illustrations are exceptionally good. This is again a very useful and comprehensive book.

C. RAYMOND ARP, M.D.

**POSTGRADUATE LECTURES ON ORTHOPEDIC DIAGNOSIS AND INDICATIONS.** Vol. II. By ARTHUR STEINDLER, M.D., F.A.C.S., Professor of Orthopedic Surgery, State University of Iowa. Springfield, Ill., Charles C Thomas, 1950. 98 pages. Gray fabric material. \$6.00.

This is the second in the series of lectures by one of the foremost and master teachers of orthopedic surgery. The book is divided into two sections: section A concerns paralytic disabilities and section B concerns static disabilities.

Lecture I under section A is concerned with the pathogenesis and pathology of poliomyelitis.

The second lecture in this section is concerned with the clinical pathology during the acute phase and the chronic stage of infantile paralysis. The author then discusses the conservative and operative indications of this entity. The chapter is devoted to paralytic scoliosis and this is an excellent discussion of a difficult subject.

The sixth lecture in section A is concerned with spastic paralysis. The various clinical types of this condition are discussed in detail.

Section B is divided into four lectures. The first is concerned with low back pain. The author is recognized as one of the authorities on idiopathic scoliosis, and the second lecture is a comprehensive review of scoliosis. The conservative and operative treatment is discussed fully. The following lecture on internal derangement of the knee is a section which should be read by all.

The final section deals with static deformities of the foot and ankle.

The illustrations have been well reproduced. Dr. Steindler is to be congratulated again for a very fine book.

WOOD W. LOVELL, M.D.



**CAUSALGIA.** By DR. FRANK H. MAYFIELD, M.D., Assistant Professor of Clinical Surgery, College of Medicine, University of Cincinnati; Attending Neurological Surgeon, Bethesda Hospital, Christ Hospital, Deaconess Hospital, Good Samaritan Hospital, St. Francis Hospital and Jewish Hospital, Cincinnati, Ohio. Springfield, Ill., Charles C Thomas, 1951. 65 pages. Illus. Plastic binding. \$2.25.

This is publication 58 of the American Lectures Series and is a useful monograph on causalgia. In the first paragraph the disease is described; then, a short history of it is given along with the incidence, signs, symptoms and differential diagnosis. About one-half of the monograph is devoted to the treatment of the condition, describing in detail the surgical technic for the various areas in doing sympathetic blocks or sympathectomies. The causative mechanism is gone into at some length, all of which seems to emphasize the fact that the actual mechanism is not known.

The paper is good. The printing is easily readable and the photographs are excellent. The style of writing is clear and expressive. This monograph should be found useful by the general surgeon as well as the neurosurgeon.

A. H. LETTON, M.D.

*Books received are acknowledged in this section, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.*

**SURGICAL CARE: A PRACTICAL PHYSIOLOGIC GUIDE.** By ROBERT ELMAN, M.D., F.A.C.S., Professor of Clinical Surgery, Washington University School of Medicine; Assistant Surgeon, Barnes Hospital; Associate Surgeon, St. Louis Children's Hospital; Director of Surgical Service, H. G. Phillips Hospital, St. Louis. New York, Appleton-Century-Crofts, Inc., 1951. 586 pages. \$8.00.

**PEPTIC ULCER. CLINICAL ASPECTS—DIAGNOSIS—MANAGEMENT.** By DAVID J. SANDWEISS, M.D., A.A.C.P., Associate Physician, Division of Internal Medicine, Harper Hospital, Detroit. Philadelphia, W. B. Saunders Co., 1951. 790 pages. \$15.00.

**THE HEALING TOUCH.** By HARLEY WILLIAMS. Springfield, Ill., Charles C Thomas, 1951. 408 pages.

## ABSTRACTS FROM CURRENT LITERATURE

THE TEACHING OF PAIN. Edwin P. Lehman. *Medical Education* 26:294-296 (July) 1951.

Recognizing the difficulty of achieving accurate descriptions of pain and noting that both clinical and preclinical teachers use the terms modifying pain loosely, the author suggests a method for making the teaching of the symptom more exact. In approaching diagnosis, it is necessary to know three things about the symptom of pain: namely, its intensity, the variations of the intensity and its quality. These characteristics are distinct from facts concerning the pain such as the circumstances of the onset, its location, duration, radiation and factors which influence the pain.

Much of the confusion arises from the multiplicity of descriptive terms and their loose usage. This has prompted the author to suggest the simple line graph as a device for descriptive representation of pain. In the graphs, the axis of the abscissae designates time and the axis of the ordinates defines intensity. Steady pains, throbbing, stabbing pains, cramping and colicky pains are all easily depicted by a curve on such a graph. The author also suggests the application of musical terms such as staccatto, sostenuto, tremolo, crescendo, and decrescendo, as an aid in expressing the quality of pain.

"It is not intended to imply in this discussion that all types of pain are included. The points presented and the employment of the graphs have proved useful in aiding students to think clearly about the more common types of pain."

R. H. S.

PLEBOGRAPHY OF THE LEG IN THE ERECT POSITION. H. William Scott and John F. Roach. *Annals of Surgery* 134:104-109 (July) 1951.

In this report from the Johns Hopkins group, a technic for contrast medium visualization of the deep venous system of the leg is presented. A principle, previously advanced by Mahorner, employing injection into a vein of the dorsum of the foot with utilization of a tourniquet about the ankle to force the medium into the deep venous system, is supplemented by using the erect position to prevent too rapid emptying of the system. The medium employed is 35 per cent Diodrast. The usual volume injected is 20 cc. but certain conditions indicate the use of a larger volume (30 to 50 cc.).

The method has proved to be quite helpful in the evaluation of patients with postphlebitic sequelae.

A photograph illustrating the position of the patient and phlebograms illustrating the normal, a postphlebitic pattern, and comparative phlebograms in the erect and recumbent positions are included.

R. H. S.

A NEW OPERATIVE APPROACH TO INFLAMMATORY STRICTURES OF THE RECTUM AND RECTOSIGMOID. Ben Eiseman and C. Barber Mueller. *Surgery* 30:448-455 (Sept.) 1951.

The obvious way to deal with uncontrolled inflammation or stricture of the rectum is by colostomy but those experienced in the management of lymphogranuloma venereum point out that the diseased and infected bowel remains, sometimes bleeding, often causing abscesses, fistulae and discharge. Excision of the strictured segment with pull through of the colon is a direct

approach but in the occasional case where the disease extends higher, this operation is not applicable. Miles' type combined abdominoperineal resections for lymphogranuloma have been found to carry a mortality rate several times that incurred when it is employed for cancer. Also, it is generally felt that, while colostomy is a small price to pay for survival and cure in malignant disease, it seems rather drastic when dealing with inflammation and its sequelae.

Herein is described a new operative approach to the problem. This consists of abdominoperineal excision of the diseased bowel with preservation of the sphincter and the employment of a segment of ileum swung down with its mesentery to re-establish continuity by joining it to the colon and pulling it through the anal sphincter. A case is reported in detail in which this was successfully employed with re-establishment of normal fecal movements and complete continence. The operative procedure employed is described in detail and illustrations accompany the text.

R. H. S.

MEDIAL DEVIATION OF THE URETERS COMPLICATING CARCINOMA OF THE RECTUM AND SIGMOID, AND PROCTOSIGMOIDECTOMY. Richard J. Spillane, Thomas F. Kaiser and George C. Prather. *Surgery, Gynecology and Obstetrics* 93:273-282 (Sept.) 1951.

Medial bowing of the ureters at the level of the midsacrum or promontory may occur following excision of the rectum but may also be found with metastatic involvement of the iliac lymph nodes. When present, this particular ureteral deformity may be indicative of either instance. At times, the ureteral deviation is marked and serious upper urinary tract complications may result.

The authors herein report 9 cases of medial deviation of the ureters. Brief clinical histories of these cases are included. Reproductions of the pyelograms accompany the text. The authors conclude from their study of these cases that medial deviation of the ureters may occur as a result of: (1) local pelvic extension or lymph node metastasis from lower bowel carcinoma, (2) Miles' resection with recurrence, and (3) combined abdominoperineal resection alone. They point out that when the deformity is a result of the surgery it is usually due to the manner of peritonealization of the pelvic floor and may be prevented by careful development of the peritoneal flaps and closure of the peritoneum without tension on the ureters.

A suggestion is made for a distinction in terminology. "Medial fixation" of the ureters could be considered the result of carcinomatous involvement, whereas "medial deviation" should be reserved for those instances in which the deformity is a result of the surgery.

R. H. S.

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